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ABSTRACT
        The papers presented in this conference proceedings
describe specific strategies and techniques that can be used to
enhance and improve undergraduate psychology instruction. The
following papers are included: (1) "Playing the Dating Game: An
Experimental and Empirical Exercise on Sex-Roles," by Ann L.
Saltzman; (2) "Small Group Research Experience in Introductory
Psychology," by Pam Wasserman, Carol Campbell, and Barbara Shultz;
(3) "Making Memory Meaningful: Classroom Demonstrations, Examples,
and Practical Suggestions," by Celia C. Reaves; (4) "Autobiography as
a Method for Teaching General Psychology," by Maria A. Taranto; (5)
"Microcomputers in a Personalized Self-Instruction Course," by Morton
Isaacs and Roger Harnish; (6) "Interactive Computer Testing as an
Effective Learning Tool," by Joan Cook; (7) "A First: A Psychodrama
Course as Part of an Undergraduate Psychology Curriculum," by Peter
L. Kranz and Kathleen M. Houser; (8) "Developmental Strategies for
Teaching Developmental Psychology: One Teacher's Experience," by
Janet Kalinowski; (9) "An Undergraduate B.S. in Environmental
Psychology: Development, Experience, & Evaluation," by John B.
Morganti; (10) "A Classroom Demonstration of the Stigmatizing
Influence of Mental Illness Labels," by Bernard Balleweg; (11)
"Classifying the Character of Esther Greenwood in Sylvia Plath's 'The
Bell Jar': A Technique For Teaching Psychological Disorders," by
Andrea S. Zeren and Nancy Lusignan Schultz; (12) "Testing,
Measurement, and Evaluation in the College Classroom," by Linda L.
Dunlap; (13) "Enhancing the Pre-Exam Review," by Howard C. Berthold,
Jr.; (14) "How Item Order Affects Scores and Completion Times on
Multiple Choice Tests," by William R. Balch; (15) "Cognitive
Psychology Meets the NCC (Nassau Community College) Faculty," by
Diane E. Kramer; (16) "Unblock: Enhancing Creative Thinking," by Joan
C. Chrisler and Climeen Wikoff; (17) "Teaching Psychology of
Learning: The Benefits of Student Discovery," by Howard M. Reid; and
(18) "Multipurpose Use of Computers in the Teaching of Introductory
Psychology," by Lawrence G. Shattuck and Johnston Beach. (AAZC)

Teaching of Psychology: Ideas and Innovations

Proceedings of the Second Annual Conference

held

March 25, 1988

at the

State University of New York College of Technology

at Farmingdale

Judith R. Levine and Stanley C. Feist, Editors

SUNY College of Technology at Farmingdale

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INTRODUCTION

The Second Annual Conference on Undergraduate Teaching of Psychology met on March 24-25, 1988 in Farmingdale, New York.

The goal of the conference was to present specific strategies and techniques that might be used to enhance and improve the teaching of undergraduate Psychology.

The conference was attended by some 83 high school and college psychology instructors from seven states. They heard 24 papers and a keynote address by John Dworetzky. Eighteen of those papers are included in these Conference Proceedings. The response of the presenters and attendees was very favorable for a Third Conference next year, 1989.

We would like to thank the following individuals for their efforts in organizing this conference: Dr. Paul Bedell and Dr. Nancy Philips who assisted in the paper selection process; Ms. Kristina Clenaghan and Ms. MaryBeth Sclafani for providing support services; Ms. Barbara Sarringer who provided much needed secretarial support.

<div align="right">

Judith R. Levine, Ph.D
Stanley C. Feist, Ph.D

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JRL/SCF: bas

STATE UNIVERSITY OF NEW YORK
COLLEGE OF TECHNOLOGY

------FARMINGDALE------

The Psychology Department of SUNY Farmingdale
in cooperation with the
Division of Continuing Education presents

THE 2ND ANNUAL CONFERENCE ON UNDERGRADUATE

TEACHING of PSYCHOLOGY:
IDEAS & INNOVATIONS

THURSDAY EVENING, MARCH 24, 1988

PLENARY SESSION-- 7:00 to 9:00 P.M

WELCOME ADDRESS

BUSINESS OF THE CONVENTION

CONFERENCE PROGRAM: FRIDAY, MARCH 25, 1988

8:45- 9:30 a.m.   REGISTRATION -Coffee & cake-- Textbook Displays

SESSION ONE-- 9:30 A.M. to 11:15 A.M.

Room 1   PRESIDER. Virginia Ryan, Sage/ JCA

AN EXPERIENTIAL APPROACH TO TEACHING GROUP DYNAMICS
Paul Bedell, SUNY College of Technology at Farmingdale, N.Y.

PLAYING THE DATING GAME: AN EXPERIENTIAL AND EMPIRICAL
        EXCERCISE ON SEX ROLES Ann L. Saltzman, Drew University

SMALL GROUP EXPERIENCE IN TEACHING INTRODUCTORY PSYCHOLOGY
Pam Wasserman and Carol Campbell, Mentor
Long Island University, C.W. Post Campus, New York

Room 2   PRESIDER, Lisa Whitten, SUNY Old Westbury, N.Y.

STEVE & JERRY 'S HELPFUL CLASSROOM HINTS: THINGS THAT
        HAVE WORKED & THINGS THAT HAVE BOMBED
Jerry Annel, Illinois Valley C. C., Ill,
Steve Coccia, Orange County C. C., N.Y.

MAKING MEMORY MEANINGFUL: CLASSROOM DEMONSTRATIONS,
        EXAMPLES AND PRACTICAL SUGGESTIONS
Celia C. Reaves, Monroe Community College, N.Y.

AUTOBIOGRAPHY AS A METHOD OF TEACHING A COURSE IN
        GENERAL PSYCHOLOGY Maria A. Taranto, Nassau C. C., N.Y.

Room 3:   PRESIDER. Johnston Beach, U.S. Military Academy West Point, N.Y.

MICROCOMPUTERS IN A PERSONALIZED SELF-INSTRUCTION COURSE
Morton Isaacs and R. Harnish, Rochester Institute of Technology

INTERACTIVE COMPUTER TESTING AS AN EFFECTIVE LEARNING TOOL
Joan Cook, County College of Morris, New Jersey

THE LEARNING DISABLED COLLEGE STUDENT
Marilyn Blumenthal, SUNY College of Technology, Farmingdale

11:15 A.M. to 11:45 A.M., TEXTBOOK DISPLAYS,-- COFFEE

SESSION 2--11:45 A.M. to 1:00 P.M.

Room 1   PRESIDER, Ron Cleeve

PSYCHODRAMA: A UNIQUE COURSE FOR UNDERGRADUATE PSYCHOLOGY
        STUDENTS,
Peter L. Kranz, Kathleen Houser, Lock Haven University, Pa.

DEVELOPMENTAL STRATEGIES FOR TEACHING DEVELOPMENTAL
        PSYCHOLOGY: ONE TEACHER'S EXPERIENCES
Janet Kalinowski, Ithica College, New York

Room 2   PRESIDER, Howard Berthold, Lycoming College, Pa.

TEACHING ABOUT BLACK FAMILIES
Lisa Whitten, SUNY Old Westbury, New York

AN UNDERGRADUATE B.S. IN ENVIRONMENTAL PSYCHOLOGY:
        DEVELOPMENT, EXPERIENCE AND EVALUATION
John B. Morganti, SUNY College at Buffalo, New York

Room 3   PRESIDER, David Malcolm, Fordham University, New York

A CLASSROOM DEMONSTRATION OF THE STIGMATIZING INFLUENCE OF
        DIAGNOSTIC LABELS
Bernard J. Balleweg, Lycoming College, Pa.

CLASSIFYING THE CHARACTER OF ESTHER GREENWOOD: A TECHNIQUE FOR
        TEACHING PSYCHOLOGY DISORDERS
Andrea S. Zeren and Nancy L. Schultz, Salem State College, Ma.

LUNCH   1:00--2:30   P.M.
KEYNOTE ADDRESS--INTEGRATING PSYCHOLOGY DIVERSITY
JOHN DWORETZKY, NOTED AUTHOR AND TEACHER

Textbook Displays

Session 3-- 2:35 P.M. to 4:20 P.M.

Room 1   PRESIDER, Sandra Gonsalves, Kean College, New Jersey

ISSUES TO CONSIDER WHEN·SELECTING MEASUREMENT TECHNIQUES
    FOR STUDENT EVALUATIONS   Linda L. Dunlap, Marist College

ENHANCING THE PRE-EXAM REVIEW
Howard C. Bertnold, Lycoming College, Pa.

HOW ITEM ORDER AFFECTS SCORES AND COMPLETION TIMES ON
    MULTIPLE CHOICE TESTS
William R. Balch, Pennsylvania State University, Pa.

Room 2   PRESIDER, John Morganti, State University College, Buffalo, N.Y.

COGNITIVE PSYCHOLOGY MEETS THE NCC FACULTY
Diane Kramer, Nassau Community College, New York

UNBLOCK: A WORKSHOP ON CREATIVE THINKING
Joan C. Chrisler, Connecticut College, Conn.
Climeen Wikoff, Columbia University, New York

TEACHING PSYCHOLOGY OF LEARNING: BENEFITS OF STUDENT DISCOVERY
Howard M. Reid, State University College at Buffalo, N.Y.

Room 3   PRESIDER, Sherman Ross, Howard University, Washington, D.C.

COMPSYCH: AN ELECTRONIC INFORMATION AND DISTRIBUTION SERVICE
    FOR PSYCHOLOGICAL SOFTWARE
Margaret Anderson, Peter Hornby, SUNY, Plattsburgh, N. Y.
David Bozak, SUNY Oswego, New York

DEVELOPMENT OF A COMPUTERIZED LABORATORY FOR INTRO PSYCH
Peter Hornby and Margaret Anderson, SUNY Plattsburgh, N.Y.

MULTIPURPOSE USE OF COMPUTERS IN THE TEACHING OF INTRODUCTORY
    PSYCHOLOGY,   Lawrence Shattuck and Johnston Beach,
United States Military Academy, West Point, New York

4:30 P.M. TO 6:00 P.M. SOCIAL HOUR
PLEASE COMPLETE THE CONFERENCE EVALUATION FORM

Playing the Dating Game:

An experiential and empirical exercise on sex-roles.

Ann L. Saltzman

Drew University

Madison, N.J.

Many courses in Introductory Psychology commence with a discussion of how psychologists conduct research during which the vocabulary of psychological methodology is introduced. These discussions can be notably dull, turning-off prospective students of psychology. The following exercise was developed to overcome this pedagogical difficulty by first engaging students in a data-collection exercise of intrinsic interest; i.e., choosing a prospective date, where the descriptions of possible dates are manipulated to include different sex & sex-role combinations. Subsequent analysis of the data provides a basis for discussing how perceived sex-role affects dating choices.

This combination of experiential and empirical components serves several functions: (1) It allows students to gain insight into their own preferences for type of date; (2) It enables students to compare their preferences with other students. That is, students are introduced to the concept of norms. These norms may be recalled in later discussions of research on sex-roles; (3) It allows students to gain first hand experience in all phases of the research endeavor (design, data collection, data analysis including the use of elementary statistics, and interpretation).

This paper will describe both the experiential and empirical components of the Dating Game and then present a variety of suggested follow-up activities.

The experiential component: Playing the Dating Game

Students are asked to read the description of three males and three females who are looking for dates. These descriptions

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are correlated with six of Bem's (1974) possible sex X sex-role combinations. The following three descriptions represent the feminine-typed male, the masculine-typed male and the androgynous male, respectively.

> JOHN describes himself as a warm, sensitive and empathic human being. He is cuddly, good-looking, loves children and is also a gourmet cook. He is studying art history, but also enjoys listening to chamber music, discussing philosophy and reading poetry with a special someone.

> MIKE is a rugged masculine type. Your basic jock, he enjoys body building, tennis, jogging, skiing, sailing and swimming. He describes himself as intelligent and reasonable and plans on becoming a successful sportswriter. He is looking for someone with whom he can have a "sporting good time".

> BILL is an aspiring engineer. He is assertive, ambitious and attractive. His interests are diverse and include reading, going to the movies, jogging and playing racquetball. He has his quiet side also--he describes himself as a compassionate, sincere person who is a good-listener. He is looking for a conversation partner. Are you the one?

Analogous descriptions of a feminine-typed female, masculine-typed female and androgynous female are also provided.

Students are then asked to (1) indicate their first, second and third choices for a date; and (2) imagine the other sex's choices. That is, in addition to their choices of a female date, men are asked to indicate the choice they think women will make for a male date. Similarly, women are asked to choose a male date and to indicate the choice they think men will make for a female date.

Students are then divided into small groups of ten to discu s their choices. One student from each group is asked to record the actual cho'ces and the reasons given for these

choices. While the students engage in this exercise, the data are tabulated. After the results are tabulated, the class is reconvened. The recorder from each group reports the results; all students are invited to participate in the ensuing discussion which also incorporates the numerical data.

The empirical component

Tabulating the data

Each first choice is assigned the number 1; each second choice is assigned the number 2, etc. Means are then tabulated for (1) male choice of female date (actual male choice); (2) female choice of male date (actual female choice); (3) male's projection of female choice of male date (projected female choice) and (4) female's projection of male choice of female date (projected male choice). In order to facilitate a discussion of the results, these data are displayed in both matrix and graphic formats.

Summary of results

The data collected over the past three years have been consistent. Tables 1 and 2 display the means for the actual and projected choices of male and female date. For both male and female dates, the androgynous person is the actual and projected first choice. Although actual analyses of variance were not conducted during the class sessions, subsequent analyses of the cumulative data indicate that these preferences are highly significant. (For male date, $F(2,648)= 174.82$, $p<.00001$; for female date, $F(2,634)=64.03$, $p<.00001$.)

Women's projections of men's second and third choices of

Tabl 1

Real and Projected Choices of Male Date as a Function of Sex-role

Type of choice	Sex-role		
	Androgynous	Masculine	Feminine
Women's real choice[a]	1.32	2.58	2.11
Men's projected choice[b]	1.37	2.37	2.26

Note. The values represent mean preferences for date where 1 equals first choice, 2 equals second choice and 3 equals last choice.

[a]Respondents were 327 undergraduate students enrolled in an Introductory Psychology course.

[b]Respondents were 320 undergraduate students enrolled in the same Introductory Psychology course.

Table 2

Real and Projected Choices of Female Date as a Function of Sex-role

	Sex-role		
Type of choice	Androgynous	Masculine	Feminine
Men's real choice[a]	1.58	2.00	2.42
Women's projected choice[b]	1.67	1.86	2.47

Note. The values represent mean preferences for date where 1 equals first choice, 2 equals second choice and 3 equals last choice.

[a]Respondents were 320 undergraduate students enrolled in an Introductory Psychology course.

[b]Respondents were 327 undergraduate students enrolled in the same Introductory Psychology course.

date closely match men's actual choices; the feminine sex-typed woman is always the least preferred. Men's projections of women's second and third choice of male date are less accurate. While women next prefer the feminine-typed male and least prefer the masculine-typed male, men do not distinguish between the feminine-typed and masculine-typed males in their projected choices. While these differences are not statistically significant, they suggest that men are more confused about what women expect from them than woman are about men's expectancies for them.

Introducing terminology

After the data are displayed, analyzed and interpreted, the discussion is expanded to "walk" the student through the research process and to introduce the appropriate research vocabulary. It is explained that the Dating Game represents a common research technique for investigating sex-roles.

Suggested follow-up activities

The first follow-up activity involves an historical review of how sex-roles have been studied in psychology. A sub-sample of Terman and Miles' (1936) masculinity-femininity items are presented to students along with the scoring key. Thus, students are able to identify their level of masculinity or femininity as defined by the unidimensional, bipolar continuum utlized by early research on sex-roles.

Based on past responses, students tend to be alternately amused and offended by the norms provided by Terman and Miles.

It is not long before they reach the accurate conclusion that these norms represent the 1936 societal expectations of men and women. On the one hand, this allows them to dismiss the results as irrelevant to today's standards. On the other hand, they are pressed to recognize that this is an example of how cultural pressures mold psychological research.

This latter theme is reiterated in the discussion of Bem's more recent research on sex-roles. Students are given the opportunity to personally complete the Bem Sex-Role Inventory. The difference between Bem's two-dimensional schema of masculinity-femininity and the earlier unidimensional conceptualization is underscored. Yet, as students are guided through her scoring key, they are again forced to conclude that Bem's norms represent nothing more or less than the 1974 societal definitions of masculinity and femininity.

With these thoughts in mind, students are now able to return to the results of The Dating Game. They can now identify the androgynous, masculine-typed and feminine-typed stimulus persons using Bem's terminology. The student preference for androgyny is shown to be consistent with Bem's (1975, 1976) findings that androgyny allows for more flexible behavior, higher self-esteem and leads to enhanced mental health.

Depending on the time alloted, the instructor can take the discussion in one of three directions. First, the instructor can pursue the issue of how psychology, the academic discipline has been molded and shaped by socio-historical forces. Consistent with Gergen's (1973) concept of "psychology as history", the

remainder of the course could be structured along historical lines.

The second direction is more specific to sex-roles. Two intriguing trends emerge from the Dating Game data: the devaluation of "the feminine" and the confusion over the male sex-role. One could delve more deeply into the implications of these issues, including a presentation of the research which relates the devaluation of the feminine to the stigma attached to men engaging in cross-sex behavior (Feinman, 1981; Tilby and Kalin, 1980). An interesting variation of the Dating Game is to ask students to choose their preference of male and female friend, and again to project the choices made by members of the other sex. Data derived from this variation document that the feminine sex-typed individual is still the last choice and that men are more subject to conflicting sex-role expectations than women (Saltzman, 1988). This whole discussion could serve as a bridge to discussing developmental theory, interpersonal relations or role-related stress.

Finally, the instructor may wish to focus the discussion on methodological controversies. Sex-role researchers have begun to turn away from the kinds of methods used by Bem and Terman and Miles in favor of interviews and more open-ended questionnaires (Lewin, 1984; Spence and Sawin, 1985). This movement parallels the current debate within psychology over the pros and cons of a positivist approach to research. The interested instructor could structure the remainder of an Introductory Psychology course by addressing how this debate runs through the research in other

"content areas" of psychology.

Conclusion

The Dating Game exercise has proven to be a successful way
to ease students into the study of psychology for several
reasons. First, students are intrinsically interested in dating
decisions; indeed much of their life "outside of the classroom"
may be consumed with such decisions. Second, the exercise allows
students to experience (and identify) the multiple phases of the
research process within a given class session. Third, and in the
mind of the author the most exciting component of the exercise,
it can lead the student to an awareness of two controversial
issues which transcend research on sex-roles: (1) how the
discipline of psychology has been molded by socio-historical
forces and (2) the controversy over the appropriate ways to
understand and conceptualize human behavior. In this way, the
student is led to the deeper questions raised by the discipline
which have transcended time and place.

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Small Group Research Experience in

Introductory Psychology

Pam Wasserman, Carol Campbell and Barbara Shultz

C. W. Post Campus of Long Island University

When a new Instructor is assigned the task of teaching Intro-
ductory Psychology, he or she is often faced with two problems:
(1) how to "personalize" instruction in large classes (so that
students do not remain anonymous throughout the semester) and, (2)
how to meet the diverse content and skill needs of students pre-
paring to major in Psychology while still serving students taking
Introductory Psychology courses as electives or as a general college
requirement.

The question of class size has been addressed in research by
McKeachie who reviewed in 1980 the literature and concluded that
large classes were not as effective as small classes for retention
of knowledge, critical thinking skills and student attitude change.
One way of gaining the benefits of a small class, when economic
contingencies require Introductory Psychology classes with large
enrollments, is to use some type of small group experience as part
of the teaching technique.

In the Fall Term, 1987, two classes of Introductory Psychology
(at C.W. Post Campus of L.I.U.) were invited to participate in an
experimental analysis of small group activity. Both classes had a
lecture on Mondays, small group research on Wednesdays and testing
on the unit chapter on Fridays. The course required the students
to read 10 chapters of Introduction to Psychology (Atkinson, Atkinson,
Hilgard, & Smith, 1987) and to complete the corresponding study
guide materials. The lectures, test procedures and grading of oral
participation (on small group research days) was equivalent. Tests
were composed of 25 items taken from the text test pool, the study
guide and the lectures. Test questions were randomized across students
so that no two students had the same quiz.

The independent variable was the nature of the small group
research project. One class was assigned a field research project
designed to teach the scientific method in 10 steps (resulting in
original research of a survey or descriptive behavioral nature).
The other class was assigned a short experiential each week (on the
assigned chapter topic) requiring data collection and application
to some aspect of everyday living. This class was also assigned
a 10 step library research project designed to encourage in depth
coverage of a topic and critical evaluation of the text's coverage
of the topic. Each class was divided into 6 research groups (of
4 to 6 members each) based on the students' topic preferences.
Each group was required to present a 15 min. report on their semester
project at the end of term. Quiz grades counted 50%, weekly oral
participation grades counted 25% and the final project presentation
counted 25% to comprise the final grade.

The dependent variables were of 3 categories: academic, behavioral,
and attitudinal. The academic measures were: best 8 of 10 weekly
quiz grades, best 10 of 12 weekly oral participation ratings, ratings
of project presentations and final letter grades. The behavioral
criteria were: total days of attendance, the number of times a
student attended optional tutorials with the professor or 4 teaching
assistants, and the number of times books were used (from a library
cart of 53 current Introductory Psychology texts). The book cart
was available on group research and test days and also during the
last 2 weeks of class during 10 tutorial hours per week. The attitude
variables were 5 questions (about the impact of group experience)
included on an anonymous course evaluation given at the end of term.

Data were analyzed with t tests, Mann Whitney U tests or Chi
Square tests according to the nature of the variables. The academic
criteria uniformly resulted in no significant differences between
the two small group research methods. Regarding the behavioral vari-
ables, some differences did obtain. While the total number of days
attended was statistically equivalent for both classes; use of books
was greater for the library research group (p= .00000007, df=61),
while use of tutorials was greater for the field research group
(p=.05, df=63). Both groups attended tutorials for the same reasons
(to take a makeup quiz, to be tutored on a specific chapter or to
discuss course rules and study habits). Analysis of the evaluation
questions about the experience indicated that the library research
group was most positively influenced by their small group experience.
These students said that they learned more about Psychology and
gained greater personal insight than did the field research class.
The library research group also reported that the group experience
provided continuity or "connectedness" of the course content, increased
enjoyment of the course (p=.03) and increased the likelihood of their
forming spontaneous groups outside of class to study for the quizzes
(p=.06). Reliability of oral participation ratings was obtained by
having a second independent observer rate each student for 7 of the
10 rating sessions. Reliability of final project ratings was obtained
in a similar manner. Both indices exceeded the 80% criterion established
in the behavioral literature. Quality control of quiz grading was
established by having objective grading criteria and by counterbalancing
of graders (so that each teaching assistant graded half of each
class's 10 quizzes in a randomized order). Analysis of tutorials
indicated that both groups received equal attention and advice about
the research projects.

Since both classes performed at the same level in terms of
academic criteria (project grades, test scores, oral participation,
final grades), the differences between groups on the behavioral and
attitudinal variables cannot be attributed to having a more successful
academic experience in the course. The students in both classes also
had equal participation with the course activities as evidenced by
the equivalence in attendance scores of the two groups. Hence, it
is more likely that the differences in the behavioral and attitudinal
variables were largely due to the type of small group research
experience. The library research group used more books, even though
the library cart was available to both classes and the professor
encouraged its use in both classes. However, the library project
placed a greater contingency on using any references than did the
field research project. The field research group attended optional
tutorials more often (though neither class fully utilized this
resource).

While significant differences did not obtain on all of the
attitude variables, conservative statistical analysis was employed
and the data always favored the library research class. It seems
that having weekly data-based applied experientials on the chapter
topics and a term long library project on a favored topic engendered
more favorable ratings of the small group experience. The field
research project, while producing generally favorable ratings, did
not encourage as positive an experience of the first semester of
Introductory Psychology. Will these same results obtain for the
second term of Introductory Psychology? Will the type of small
group research experience relate to a student's decisions to take
more Psychology courses? A followup study of these students will
evaluate the long term consequences of small group research experience.

MAKING MEMORY MEANINGFUL:
Classroom Demonstrations, Examples, and Practical Suggestions

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Students take introductory psychology for many reasons, but one of the most common has to be an interest in the reasons behind the fascinating, even bizarre, behavior they see in the people around them. Psychology has much to say about the causes of such behavior, so these students are rarely disappointed. But some students, and even some professors, can see little to excite them in other areas, where the material seems dry, empty, irrelevent to daily life. I am constantly amazed to discover that the study of memory is considered by some to be one of these uninteresting areas. Why is this amazing? Because students, by definition, are struggling nearly every day with memory tasks which are difficult but important, as they study their coursework and prepare for tests. Psychology can have as much to say about their lives as students as it has to say about their lives as parents, children, lovers.

The purpose of this paper is to collect together some of the examples, demonstration, and practical studying suggestions I have used over the years to show students how important the psychology of memory is to what they do every day as they work toward their degrees. The material is organized along a more-or-less generic outline of the study of memory, and can be adapted to fit almost any introductory textbook. None of the material is original to me, but it has not been put together in one place before, making it easier for instructors not quite so familiar with the field to find and use it.

The reason for my emphasis on classroom demonstrations grows out of my knowledge of memory. Becoming actively involved in a phenomenon, recalling a time when it happened to you, knowing what it feels like, makes it much easier to understand and remember the phenomenon. If we want students to remember the important principles of anything, it helps to let them experience it themselves. The demonstrations included in this package will make it harder for the students to forget what we mean by constructive, or why organization is so important.

One general point should be made. Most of the demonstrations included here use various forms of incidental learning, in which students interact with some material and later are unexpectedly asked to recall it. This typically produces very low levels of memory; the students often remember only two or three items from a twenty-item list. Be sure to reassure the students that this is normal and expected, or they may take it as "proof" that they have very bad memories, or even that their intelligence is below normal! The point is to help students discover how their memories do and do not work, not to discourage them about their prospects as students.

MAKING MEMORY MEANINGFUL

OUTLINE

I. Overview of the Memory System
    A. Memory as a Collection of Processes
    B. Processes differ in:
        1. Type of information processed
        2. Amount of effort required
        3. How long the effect lasts

II. Automatic Memory Processes
    A. Definition: processes that require no effort, little training.
    B. Allows you to remember things you never consciously tried to memorize.
    C. Examples:
        1. Constant monitoring of position: Close your eyes. Can you point to the direction of the door you entered through?
        2. Frequency: When you run into an acquaintance for the third time in one day, and you realize it.
        3. Autobiography: What did you have for breakfast?
    D. Implications for studying:
        1. Automatic processes can help you remember some information without even trying: How many times did that term appear in the chapter? Where did it appear on a page? Where were you when you read it? This is of little help when it comes to a test.
        2. Reading passively, just "running your eyes over the words," may produce automatic processes, but not much else.
        3. Preparing for a test requires something more than automatic processes alone. It takes effort.

III. Awareness and Effort
    A. Definition: The information currently being processed, what you're thinking about at the moment.
    B. Limitations
        1. Miller's Magic Number (7 +/- 2)
        2. Example: Thinking of a phone number until dialing
        3. DEMONSTRATION: LIMITATIONS OF AWARENESS
    C. Implications for Studying:
        1. Better chunks make for better memory. Experts in any field (chess, sports, etc.) differ from novices in the chunks they use.
        2. Whenever you feel that there's just too much stuff to learn (a feeling like in the demonstration with the long lists), look for ways to put more information into fewer chunks

IV. Effortful Processes
    A. Definition: Processes that require effort, training.
    B. Maintenance Rehearsal
        1. Definition: Reciting lists of things over and over without thinking of them very much.
        2. Example: Saying a phone number over and over until you get to dial it. Then when the phone rings and the operator asks what number you dialed, you don't remember.
        3. Maintenance rehearsal keeps information in awareness, but has very little other effect; not useful for later memory.
        4. DEMONSTRATION: MAINTENANCE REHEARSAL

MAKING MEMORY MEANINGFUL

(Effortful processes -- continued)
    C.   Meaning
        1.   Thinking about the meaning, implications, relevance, interpretation
            of the information.
        2.   DEMONSTRATICN: MEANING AND MEMORY
    D.   Organization
        1.   Thinking about the relationships between piece nf information, how
            they relate to each other.
        2.   DEMONSTRATION: ORGANIZATION AND MEMORY
    E.   Implications for Studying:
        1.   Studying takes work. It cannot be done effectively without engaging
            in effortful memory processes.
        2.   The more different processes you use, the more effective the memory
            produced and the longer it lasts.

V.   Forms of Information
    A.   Information is not simply stored, it is selected, encoded, and stored in a
        particular form.
    B.   The form of the information encoded and stored strongly affects what can
        be remembered and how easily it can be remembered.
    C.   Some lists are stored in a particular order (e.g., the alphabet, your
        telephone number), some is not stored at all, because it is not
        information you need to have under normal conditions
    D.   DEMONSTRATION: FORM AND MEMORY
    E.   Implications for Studying:
        1.   It is important that you select the form in which you will rememb r
            the informa ion based on how you will have to recall the information
            later on.
        2.   There are different kinds of knowing. When students and teachers
            disagree on whether or not the student "knows" the material, the
            debate is really about what form of knowing is appropriate.
        3.   A student may consider material "known" when it feels familiar as
            the student glances over the chapter before a test. Often the
            student cannot explain the material without the book at hand.
        4.   It is pointless to argue over whether the material is or is not
            "known." Instead, the teacher must specify what actual behaviors
            will be required, and focus the debate on those behaviors.

VI. Retrieval
    A.   Constructive Memory
        1.   Memories are not actually "retrieved," they are "built" at the time
            of recall, based on true memory traces and on other information,
            expectations, and so on.
        2.   Example: Elizabeth Loftus's work on eyewitness testimony.
        3.   DEMONSTRATION: CONSTRUCTIVE MEMORY
    B.   Recall cues: Any external information that helpr trigger a memory.
        1.   Examples: Smells, photos, music
        2.   Memory is improved when the cues that were present during learning
            are also present at recall.
        3.   DEMONSTRATION: CUED RECALL
    C.   Implications for Studying:
        1.   Try to study in an environment as similar as possible to the
            environment in which you will be tested.
        2.   Try to create your own cues for difficult information. Think of a
            song, an image, etc. to associate with the information.

LIMITATIONS OF AWARENESS: A Classroom Demonstration

Hardly anyone needs information on how to demonstrate Miller's Magic Number, the limitation on the capacity of awareness. However, for those who would rather not have to make up their own lists of random letters, here are some:

3 letters:	I	N	W								
5 letters:	L	U	F	J	M						
7 letters:	W	T	Z	A	Y	V	L				
9 letters:	G	F	P	L	A	U	O	D	K		
11 letters:	F	J	W	B	V	E	N	X	C	H	K

Read the lists out loud, enunciating carefully. At the end of the list, say, "Go," and have the students write down as many letters as they can remember in order. Pause for recall, and then read the list again and ask how many got them all. It is very easy to do 3 letters, very hard to do 11. Usually around 7 letters they begin to chuckle, as they reach the limit of their STM processes. Describe the limitation as seven plus or minus two "chunks," and define a chunk.

It is useful to go on to demonstrate the power of chunking before you emphasize it verbally. Repeat the same letter-span task as above, but this time with 12 letters: J F K I B M U S A F B I. Then I usually just ask who got all 12 letters. Most students look confused ("You haven't told us yet what the letters were!"), but I tell them that if they got them all, they'd know it. Usually a few raise their hands, and I say that those were the students who noticed the pattern: JFK, IBM, USA, FBI. They groan, but the point is made. With the proper chunks, this list isn't 12 chunks, it's only four, and four is easy.

(Miller, G. A. (1956). The magical number seven, plus or minus two: Some limitations on our capacity for processing information. Psychological Review, 63, 81-97.)

Celia C. Reaves, Monroe Community College, 10/87

MAINTENANCE REHEARSAL: A C' sroom Demonstration

PART I: Task is to listen to this list of words (read aloud fairly rapidly) and
at the end write down the LAST word on the list that began with the letter G.

1. DRUMMER	20. BUTTON	39. HEARING.	58. CONDITION
2. RADIATOR	21. NEIGHBOR	40. FORBIDDEN	59. GREYHOUND
3. GLUE	22. BAPTIZE	41. DURESS	60. MERCURY
4. MAGNET	23. RECORD	42. AUDIT	61. RUSTIC
5. GROWL	24. ISOLATE	43. CELESTIAL	62. GALLERY
6. OVER	25. LESSON	44. GANDER	63. RADIO
7. KITCHEN	26. GOLDEN	45. FINANCIAL	64. LETTER
8. HIGHWAY	27. COURTSHIP	46. ORGAN	65. CYLINDER
9. AUCTION	28. HORSESHOE	47. GARDEN	66. DICTIONARY
10. SCANDAL	29. LATCH	78. EARPHONE	67. CALORIES
11. IMPORT	30. GENIUS	49. PET	68. BACKWARD
12. DURABLE	31. REPROACH	50. FINGER	69. MODEL
13. TENSION	32. MIDDLE	51. CRYSTAL	70. DAMAGE
14. VERBAL	33. GINGERBREAD	52. PETITION	71. PRESENCE
15. GOOSE	34. UNDERSTOOD	53. RUIN	72. SHAPE
16. CROSSING	35. CHRONIC	54. SENSELESS	73. GROUND
17. BLIND	36. ANIMAL	55. VAST	74. RECOIL
18. INDUCE	37. SCREEN	56. OTTER	75. DOWN
19. PLAYGROUND	38. ROAD	5". FINISH	

Correct Answer: GROUND

PART II: Task is to try to recall as many G-words as possible from the list.
Do not keep trying forever; once you've slowed down substantially, stop. (This
should be an UNEXPECTED recall.) Then count the number of G-words remembered
in each of the categories listed below. Is there a difference? If all you
were doing was maintenance rehearsal, there probably won't be a difference.
Even though the words in Category II were held in consciousness 5 times as long
as the ones in Category I, they are no more likely to be remembered. MORAL:
Maintenance rehearsal, by itself, does NOT improve later memory for the items.
(Craik, F.I.M., & Watkins, M.J. (1973). The role of rehearsal in short-term
memory. Journal of Verbal Learning and Verbal Behavior, 12, 599-607.)

CATEGORY I	CATEGORY II
GLUE	GROWL
GENIUS	GALLERY
GREYHOUND	GINGERBREAD
GANDER	GOOSE
GOLDEN	GARDEN

The G-Words are grouped by the amount of maintenance rehearsal each received,
as determined by the number of other words intervening before the next G-word.
The last G-word (GROUND) is not included. The words in Category I were
rehearsed for an average of 2 words only; those in Category II, an average of
10 words.

Celia C. Reaves, Monroe Community College, 9/87

MEANING AND MEMORY: A Classroom Demonstration

PART I: Task is to listen to the following list of 20 words and make a decision about each one.   There are two decisions:

> A: How many Syllables are in the word?
>
> B: Is the word Pleasant or Unpleasant?

Write down the decision about each word as it is read. For example, if you hear "A: ENCYCLOPEDIA," write down "6" (the number of syllables in "encyclopedia"). If you hear "B: REAGAN," write down a "P" if your personal reaction is pleasant, or a "U" if it is unpleasant. (The description of the two decisions should be visible to the students while performing their task, so they can keep them straight. It is also important that the list be read rapidly enough that the students must work quickly to make their decisions, at roughly 2 seconds per word.)

1.	A	HURRICANE	11.	A	MUSCULAR
2.	B	WAR	12.	B	FLOWERS
3.	A	DANCE	13.	B	TABLE
4.	A	TOMORROW	14.	A	WEAVE
5.	B	VACATION	15.	A	NOVELTY
6.	A	CANON	16.	A	DUCHESS
7.	B	THUMB	17.	B	EXAM
8.	B	GARBAGE	18.	B	SHOE
9.	A	INCENSE	19.	A	TISSUE
10.	B	PENCIL	20.	B	TELEPHONE

PART II: Task is to try to remember as many of the 20 words on the list as possible (an UNEXPECTED memory test). Take only enough time for everyone to recall most of the words they are likely to think of. Then have them count separately how many A words and how many B words they remembered (display the lists below). How many recalled more A words than B words? Should be almost no one. How many recalled more B words than A words? Should be many more.
MORAL: Thinking about the MEANING of the words (as required to decide pleasant/unpleasant) produces better recall than thinking about the SOUND of the words (as required to count syllables). This demonstration is based on the classic levels-of-processing research of Craik, F.I.M., & Lockhart, R.S. (1972). Levels of processing: A framework for memory research. Journal of Verbal Learning and Verbal Behavior, 11, 671-684.

"A" WORDS	"B" WORDS
HURRICANE	WAR
DANCE	VACATION
TOMORROW	GARBAGE
CANON	FLOWERS
INCENSE	EXAM
MUSCULAR	THUMB
WEAVE	PENCIL
NOVELTY	TABLE
DUCHESS	SHOE
TISSUE	TELEPHONE

Celia C. Reaves, Monroe Community College, 9/87

ORGANIZATION AND MEMORY: A Classroom Demonstration

PART I: Make up two different sheets that look the same to a casual glance.
Both of them contain the same list of words (given below) toward the top of the
page, but they have different instructions. Make sure around two thirds of the
sheet is blank. The two different instructions are:
    A: Your task is to copy this list of words over in the space below as many
times as you can. If you can copy it twice, you are doing well; if you manage
to do it three times, it is exceptional. Work as quickly as you can. Do not
use the back of the sheet.
    B: Your task is to organize this list of words into five different groups.
In the space below, write the words in five groups. The groups are: flowers,
vehicles, states, metals, and furniture. Work as quickly as you can. Do not
use the back of the sheet.
    Without telling the students that the two sheets are different, hand them
out one to each student, keeping them separate in the room (for instance, one
on the right side of the room, the other on the left). An easy way to do this
unobtrusively is to put the two stacks one atop the other, dealing from the top
for one group and from the bottom for the other. Students should keep the
sheets face down in front of them until you say to turn them over and begin,
because you will be timing them. Give them about two minutes, but if you see
that the people in group B are finishing early or need more time, you can
compress or stretch this interval. Call time when most of them have finished
categorizing their words. (You don't want the other students to start
wondering why these people have stopped writing!)
    WORD LIST: Motorcycle, Chair, Brass, Kansas, Daffodil, Aluminum,
Connecticut, Sofa, Truck, Bed, Oregon, Lily, Bus, Desk, Daisy, Virginia, Car,
Copper, Rose, Table, Iron, Michigan, Carnation, Silver, Train.

PART II: Call time and have everyone turn the paper back over face down. Talk
about something, anything, for a few moments to allow the most immediate
memories to fade, and then ask them to write down as many words as they can
remember. This should be an UNEXPECTED recall. Stop them when they've reached
the point where the memories are coming slowly. Then put the list of words on
the overhead projector, or read them out, and have the students count how many
they remembered correctly. Ask for a show of hands: How many got all 25?
24? 23? 22? And so on. Students in Group B, those who were categorizing the
words, should remember more words than those in Group A, who were just copying,
so you should see more hands one one side of the room. Their recall attempts
are also more likely to be organized (all the vehicles, then all the metals,
and so on). This demonstrates the importance of organization in memory. Even
without deliberately studying the words, without actively trying to commit them
to memory, the simple act of imposing order on the list made it easier to
remember. (This is even more impressive to the students when you note that
most of the people in the A group wrote each of those words two or three times,
but still didn't remember them as well.)
    Reference: Bower, G.H., Clark, M.C., Lesgold, A.M., & Winzenz, D. (1969).
Hierarchical retrieval schemes in recall of categorized word lists. Journal of
Verbal Learning and Verbal Behavior, 8, 323-343.

Celia C. Reaves, Monroe Community College, 10/87

FORM AND MEMORY: A Classroom Demonstration

The task in this demonstration is very simple. Have students write out the answers to several questions of the sort that might appear in a trivia game. (In fact, if you wish to expand this demonstration, perusing questions from these games could give you endless other examples.) After all questions have been answered, reveal the correct answers and ask how many got them all right. Almost no one will. The information may not have been encoded at all, because it is not needed in your daily interaction with these familiar objects. Or it might have been encoded, but not in that form, making it very difficult to retrieve.

1. Which letter(s) do NOT appear associated with the numbers on a standard telephone dial?
2. What color is the top stripe of the American flag?
3. What color is the bottom stripe?
4. How many states of the US have names that END in the letter "s"?
5. If you list the months of the year in ALPHABETICAL ORDER, which month comes FOURTH on the list?
(Think of a standard U.S. nickel as you answer these questions)
6. Which president appears on the nickel?
7. Which way is that president facing?
8. Which of these phrases appear on the BACK of the nickel:
    a. E Pluribus Unum
    b. Monticello
    c. Liberty
    d. One Nickel
    e. Five Cents
    f. In God We Trust
    g. United States of America

There are fourteen answers all together:
1. Q and Z
2. red
3. red
4. 5   (Arkansas, Illinois, Kansas, Massachusetts, Texas)
5. February
6. Thomas Jefferson
7. To the left
8. a. yes
    b. yes
    c. no
    d. no
    e. yes
    f. no
    g. yes

Celia C. Reaves, Monroe Community College, 11/87

CONSTRUCTIVE MEMORY: A Classroom Demonstration

To do this demonstration, simply read the following list aloud and ask students to listen to it. Read it fairly quickly, so as not to allow much elaborate processing, which might produce memories that are too good. This is a very old demonstration, but this version contains 20 words, a long enough list that most people won't be able to memorize it quickly.

WORD LIST

DOZE
PILLOW
SNORE
DREAM
BED
REST
RELAX
NAP
BLANKET
YAWN
TIRED
SNOOZE
SLUMBER
NIGHT
QUIET
NOD
SILENCE
SHEETS
FATIGUE
DARK

Ask the students to write down all the words they can remember from the list. Then ask them how many wrote down the word "NAP": most will have. How many wrote down "EAT": no one (it isn't on the list). How many wrote down the word "SLEEP": most of them will have, although it also isn't on the list. Even though you never said that word (until just now), students "remember" it, because it's what the list is about, and the concept of sleep is tied into the whole list. When the time comes to reconstruct the list (at recall), this theme is used as a cue, and one of the words triggered by that cue is the word "SLEEP." But the memory for the word SLEEP is just as strong, and "feels" just as real, as the memory for any word actually on the list. All memories are constructed, built out of whatever information is available about the event being remembered: actual memory traces, schemas, reasoning, expectations, biases, themes, or whatever. This is the reason behind the evidence that eyewitness testimony can easily be altered by the way the questions are asked (Loftus, E.F., & Palmer, J.C. (1973). Reconstruction of automobile destruction: An example of the interaction between language and memory. Journal of Verbal Learning and Verbal Behavior, 13, 585-589.)

Celia C. Reaves, Monroe Community College, 10/87

CUED RECALL: A Classroom Demonstration

PART I: Given below are two different lists of word pairs. Make up two
different sheets, one with each list of pairs on it, and hand them out to the
class so that each student gets only one list of pairs. (See the demonstration
on ORGANIZATION AND MEMORY for suggestions on how to accomplish this.) Allow
them a limited, very brief period of time to study the list. The instructions
to the student are also given below. Make sure they don't have enough time to
memorize the list with any success, but just enough to read it over carefully
once or twice, say around forty-five seconds, before you have them turn the
paper face down.

 INSTRUCTIONS: Here is a list of word pairs. Read the list over
carefully. You will be asked to remember the second word in each pair; the
first word is irrelevent. Read the list over as quickly as you can, as you
will not have much time to study it.

LIST A	LIST B
BEARDED - HAIRY	SHEEPDOG - HAIRY
GARDENING - DIRT	SOAPSUDS - DIRT
AUTOMOBILE - LEMON	GRAPEFRUIT - LEMON
SINGING - NOTES	MESSAGES - NOTES
MONEY - BANK	RIVERSIDE - BANK
COMMITTEE - CHAIR	DESK - CHAIR
BALLOON - LIGHT	LAMP - LIGHT
PRIEST - CARDINAL	ROBIN - CARDINAL
DANCING - CIRCLE	COMPASS - CIRCLE
BAND - HORNS	CATTLE - HORNS
CENTER - MIDDLE	BELLY - MIDDLE
SOCCER - GOAL	PLANS - GOAL
PROTECTED - SAFE	JEWELRY - SAFE
CARPENTER - NAIL	MANICURE - NAIL
LOVE - HEART	SURGERY - HEART

PART II: After everyone has turned the paper face down again, talk about
something else for a moment or two, and then ask them to try to recall as many
of the second words in each pair as possible. While you say this, put a list
of the first words on List B on the overhead projector (or reveal the list
previously written on the blackboard and concealed until this moment with the
projector screen). Make no comment as you do this, but make sure everyone
notices the list you are showing them. As usual, allow enough time for
everyone to begin to slow down in their recall. Then show them or tell them
the correct answers (the list of second words), and have them count how many
words they remembered. Ask how many people got all 15? 14? 13? 12? You
should see more hands on the side of the room that got the B list of words.
When the same cues are present at the time of recall as were present at the
time of learning, recall is improved, even when the learner paid no deliberate
attention to the cues on either occasion. (Barclay, J.R., Bransford, J.D.,
Franks, J.J., McCarrell, N.J., & Nitsch, K. (1974). Comprehension and semantic
flexibility. Journal of Verbal Learning and Verbal Behavior, 13, 471-481.)

Celia C. Reaves, Monroe Community College, 10/87

STUDYING

What is studying? Studying is any activity designed to commit information to memory, so that you can answer questions about that information later on, or use it to solve problems or carry out some task. As students, you engage in a lot of studying, hoping to pass tests and get good grades in your courses. Knowing about the psychology of memory, as covered in the chapter in your book, can be very helpful in making your studying effective. The human memory system has some amazing strengths, and some perplexing weaknesses. Studying properly can help you emphasize the strengths of your memory system, and minimize its weaknesses, so that you can learn more in less time than you otherwise might.

In this handout, we will examine some properties of the memory system that are covered in your book, looking in particular for ways to apply them to the studying process. Using the ideas here can help you get more out of this course, and probably your other courses as well.

PREPARATION

Choosing a Location. When preparing to study, your first decision is where vou will do your studying. The location in which you study is important for several reasons. One, you want to study in a place that is as similar as possible to the place where you will use the information; that is, similar to the place where you will take the test. The more cues there are in common between the learning situation and the recall situation, or the more similar your mental state, the more information you will recall. Students often say that they concentrate better while listening to the radio, or ly: ng on the bed, or munching popcorn, or whatever. This may be true. But when you get to the test, you will probably not find yourself in a room with music, beds, or popcorn. This will put you at a disadvantage on the test. So you should prepare yourself by practicing your concentration in a similar situation. This means you should study sitting at a desk, in a fairly quiet room. Even if you find this uncomfortable at first, you should stick to it, so you won't be so uncomfortable while taking a test.

Another thing about the place where you study is that it should help you keep up your concentration. Lying on the bed while studying may relax you to the point that your mind wanders, and you realize you can't remember what the last paragraph you read was about. People who claim that they can concentrate on reading a textbook for two hours straight if they can lounge in an easy chair listening to music are either very unusual people or don't really know what concentration is. When you concentrate on what you are reading, you are not thinking about other things at the same time. If you find your mind wandering to thoughts of what you did last weekend, or what you're going to have for dinner, or what your friend really thinks of your new hairstyle, then you are not concentrating. If you find you can't remember what you just read, then you are not concentrating. Concentration is work. You must minimize distractions and keep yourself alert to concentrate effectively. For most people, this again means sitting at a desk in a fairly quiet room.

Surveying the Material. Once you have selected a location, you should begin by
surveying the material you are about to study. Don't just open the book to the
first page of the chapter and begin reading. You won't have any idea of what
the material is going to be about, and this will make it hard for you to absorb
it. If the chapter opens with an outline, read it over. It will tell you what
the ideas are that we expect you to learn. Turn to the end of the chapter and
read the summary. Skim through the chapter reading the figure captions,
section headings, bold print terms, and so on. While you do this, ask yourself
questions that you think the chapter is going to answer. What are the main
ideas? How does this topic relate to that topic? What sorts of things can you
expect to learn from this chapter? This survey takes only a few minutes, but
it can make your studying much more effective.

Why does the survey help you study? It gives a framework to the encoding
processes you need to make a memory useful. Have you ever been trying to
remember something while taking a test, and all you can think of is its
location in the upper left-hand corner of some page in the book? The location
on the page was encoded by one kind of memory process, an automatic process; it
will happen pretty much no matter how you study. But that doesn't really do
you much good, does it? To remember the information itself, what it means and
how to use it to answer the test question, you need a different kind of
encoding. Meaning and organization, two of the most important types of
encoding processes, work best when you already have some general idea of what
sorts of information you are going to learn and how they fit together. This is
what the survey does. As soon as you read something, you can begin to fit it
into a growing structure of organized, meaningful knowledge. This will make it
much easier to remember the information while taking the test.

TIMING YOUR STUDYING

When should you study? How long should you study in one session? Our
knowledge of memory can help answer these questions. The timing of your study
sessions can make them more or less effective, so that you get more or less out
of each minute you spend.

Spacing the Practice. One of the simplest ways to improve your studying
efficiency is to break your study time up into lots of small sessions spread
out over several days or even several weeks. Many students will put off
studying for a test, because studying is such hard work, until the last
minute. Then, the night or two before the test, they will pull three or four
hour marathons, trying to read several chapters in one sitting without a
break. As we said before, studying requires concentration. There is probably
not one person in a hundred who can actually sit down and concentrate hard on
an entire chapter from a textbook on a new subject. The rest of us need to
take frequent breaks to keep our minds on our work. Are you planning to spend
three hours the night before a test reading the material and studying it?
Instead, spend 30 minutes in the morning and 30 minutes in the evening for the
three days before the test. It still adds up to three hours, so you are not
spending any more time, but the spaced practice is certain to be more
effective. Besides, studying this way is not as painful as those marathons.

Spaced practice means even more than this. You have to wait 20 minutes for a
bus? Flip through the chapter in the book you just read, reading the section
headings and boldface terms again. You get to class 10 minutes early? Look
over the notes you took in class last time. The kids are in bed and your
favorite TV show doesn't start for 15 minutes? Go through a few of the
questions your survey of the material raised and try to answer them, looking up
the answers if you need to. Every time you spend a few minutes on the
material, it will make it that much easier to remember later on. The first 15
minutes of studying are infinitely more effective than the last 15 minutes of a
three-hour session. (There is one exception to this rule. If the goal of your
session is not to learn information, but is instead to produce something, such
as a paper on the French revolution, then a longer session may be more
effective. But when you are studying for a test, shorter sessions are
definitely better.)

<u>Reducing Interference</u>. Another factor to take into account when scheduling
your study sessions is to try to minimize the interference between activities.
If your psychology class and your sociology class are both covering similar
topics, but the theories and terminology are different, then studying one right
after the other will probably confuse them in your mind. It is best to study
different things back to back. Do your psychology, then your math, then your
English, <u>then</u> your sociology. And, of course, take breaks in between so your
study session doesn't last too long.

Actually, the best way to minimize interference is to follow each period of
studying one subject with a period of not studying at all. Study psychology,
then cook dinner. Study math, then do laundry. Study English, then watch
television. Study sociology, then sleep. In fact, research has shown that you
remember best the things you study right before falling asleep, presumably
because there is the least possible interference caused by sleeping.

<u>STUDYING ACTIVITIES</u>

Now that we've discussed when and where you should study, we can finally get to
just what it is you should be doing while studying. In this handout we will
mention five basic activities that will help you remember the most.

<u>Active Reading</u>. The discussion on where to study mentioned that you needed a
place where you could concentrate, and the discussion of how to time your
studying mentioned that you can't concentrate for too long at a stretch. But
what is all this concentration supposed to be doing? It is supposed to allow
you to read actively. When you read a magazine or a newspaper, you are usually
using passive reading. That is, you sort of let the ideas flow over your mind,
and only grasp those that strike you as particularly interesting or relevant.
This doesn't work when you are studying course material. There you have to
read actively, which means you must force your mind to think hard about all the
ideas, terms, theories, and knowledge in the material, and use effortful
encoding so that you can remember them later.

Active reading means that you are thinking about the material. You are asking
yourself what it means, how the paragraph you are reading now relates to the
paragraph you just read, what sorts of questions might be on the test, how

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these ideas relate to your own life or experience, and whether you really
understand them. If you don't grab the information as it goes by, slow it
down, and get a good look at it, it will just flow over your mind without
sinking in. Then when you get to the test you will say to yourself, "I
remember reading about that, but I don't remember the answer to this question."

Taking Notes. When you read actively, you should take notes. Then you can use
the notes during your short, spaced study sessions to refresh your knowledge of
the material. Many students don't take notes, preferring to just read the
chapter over if they need to study more. However, reading the chapter through
a second time will probably not help you remember any more than reading it the
first time did. Active reading is work, and it goes slowly. By taking good
notes, you make sure that you only have to do it once.

Good notes are not just words and phrases copied from the book. Good notes are
written in your own words They have pictures, diagrams, examples that you
made up, reminders of how a certain idea explains something that happened to
you. You should be able to explain any term or idea in your notes to another
person, and show how it relates to your life. If you don't understand
something, just writing it down won't help you at all when it comes to a test.
Notes can only remind you of what you already know, not make you understand
something that you didn't get the first time around.

Organization and Encoding. Organized material is much easier to remember than
unorganized material. If you try to memorize all the terms in a chapter as a
random list of words, it will be very difficult. Instead, look for patterns.
See how ideas are similar or different. Most textbook authors try to help you
by opening each chapter with an outline, or using different types of headings
to show you what topics are parts of other more general topics. The survey you
did before you began actually studying is the first step in this process of
organization, but the process must go on. What are the three main processes in
memory? How are they similar? How are they different? Answering these
questions will be much more effective than simply remembering the definitions
of encoding, storage, and retrieval.

Organization is one part of the general process of encoding. Encoding material
so it will stay in your memory a long time (at least until the test is over),
and so you can call it up when you need it, also involves other activities.
Thinking of a concrete example of something encodes it for easier retrieval.
Knowing the definition of motivated forgetting is one thing; thinking about
when you completely forgot about your dentist appointment three times in a row
will make the concept more real and vivid to you, and will help you remember
it. Anything that connects the ideas to one another in as many ways as
possible will help, especially if it is personally meaningful for you. And, of
course, these vivid examples and whatever else helps you encode the information
should go in your notes.

Mnemonics. Sometimes, however, you come across something you simply have to
memorize, or something you want to memorize because the exact wording or order
of material is important. When this happens, you can create a mnemonic. A
mnemonic is some device, a memory 'trick,' that will help you recall the
information in its exact form later on. Mnemonics may use rhymes ("Thirty

days hath September...") or silly sentences ("Every good boy deserves fudge")
to give you extra clues to the information. Let's use an example from this
handout. There are 9 different topics we are covering on how to study:
Choosing a location, surveying the material, spacing the practice, reducing
interference, active reading, taking notes, organization and encoding,
mnemonics, and self-testing (coming up next). Suppose you wanted to be able to
recreate this list, in order, from memory. Start by writing down the first
letter of the key word in each topic: L, S, S, I, A, N, O, M, S. Looking at
this list, we can see that there might be a problem keeping the three Ss
straight, so we will make them different by using Su for survey, Sp for
spacing, and St for self-testing. This gives us the string: L, Su, Sp, I, A,
N, O, M, St. Now we can try to think of words that begin with each letter (or
pair of letters) in the string which will fit together to make a sentence:
Large sunny space is available now on my street. Recite this sentence to
yourself a few times, thinking about the kind of people who might say that
sentence, and the situation when they might say it. Write it in your notes.
Ask yourself a few times in the next day or so what that sentence was and what
it stood for. If you do this well, you will probably be able to reproduce that
list from memory a year from now.

Mnemonics are very useful devices for the particular problem of remembering
specific information in a specific form. They are not good for more general
studying, in which you must understand ideas and be able to apply them to new
situations. So use them sparingly. Don't try to substitute them for thinking
or understanding.

Testing Yourself. You've picked a good place and time to study. You've
concentrated hard and read actively, and you've taken good notes. You've
organized and encoded the meaningful material, and created a few mnemonics to
help you handle some specific ideas. But that's a lot to remember. How can
you keep it all in your mind for the test? The answer is, you have to test
yourself.

Taking a test is just like any other skill: it must be practiced. You
wouldn't expect to be able to drive a car, or bake a cake, or shoot a basket
just by reading about it, would you? Remembering college material is the same
way. Understanding it thoroughly and writing it down is necessary, but by
itself they won't get you through the test. You must practice remembering the
material without looking at it. Often a student will say, "I really know this
stuff," but when you ask them, for example, what the definition of retroactive
inhibition is, they will stammer a while, and then say, "I know it, but I just
can't say it." The problem is, there are different ways of knowing things.
The kind of knowing this student is talking about is knowing the general idea,
and understanding it while reading about it. The kind of knowing that will
help you pass a test, however, is something quite different. As a general
rule, if you can't explain it to a friend or family member in your own words,
so that you both understand it, without looking it up, then you don't know it
well enough to pass a test on it.

How can you tell whether you know it that well? By testing yourself. There
are lots of different ways to test yourself. You can look at the boldface
terms in the chapter and define each one and give an example, without looking

at the definition the book gives. You can make flash cards or margin notes that ask questions, and then answer those questions without looking at the answers. You can use the self-tests in the study guide that you can buy to go with the textbook. You can try to answer the questions that you wrote in your notes without reading the answer. You can get together with someone else in this course and take turns asking each other questions from the book. Any of these techniques will probably help, and the more of them you try, the better. Of course, whenever you do a self-test, you should look up the answer after you are done to make sure you got it right, and anything you missed you should study more. But be honest when you test yourself. Don't just look at a question in the study guide and think, "Right, that's easy." Don't look at the question on the front of a flash card, think a minute, then turn it over and say, "Yeah, I knew that." The only person who is hurt by that kind of shortcut is you. The self-test won't help unless you do it for real.

WHAT NEXT?

If you generally get good grades in your college courses, then maybe you don't need this handout. But if college is a struggle for you, if your grades are not as good as you would like or if you feel your study time is not being well spent, then we strongly encourage you to try actually applying these ideas to your studying. Try it in this course first, and see if it doesn't help. Then you can expand to your other courses. There really are ways to make you more successful in college.

One last thing. Without looking back, see if you can't remember that sentence we created as a mnemonic for the nine studying topics in this handout. What are the nine topics? Could you remember them? What does that tell you about how well mnemonics work, and how actively you read the handout?

Celia C. Reaves, Monroe Community College, 6/87

Autobiography as a Method for Teaching General Psychology

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Introduction The course catalogue's description of our second semester
course in general psychology, suggests that a faculty member may choose
a select body of topics from general psychology and cover them in more
depth than in the first semester general psychology course. It also
advertises that students will be involved in experimental and research
activities. In the Spring of 1986 I decided to try an innovative teaching
technique in two sections of this course.

My orientation is cognitive-developmental research. Lately, I have
become convinced of the importance of life span analysis of individuals'
lives and so, autobiography, the self report of a person's life, has become
of increasing concern to me. My interest in autobiography has led me to
question what kinds of events people have in life, the ways they look at
those events, and the way they look at life, in general. In brief, I wondered
i; people at different periods of life look at life differently. My interest
in the study of autobiography, then, led me to consider if we, as a class,
could examine autobiographies of individuals of different ages using
information from readings in general psychology, and also if we could , in
any way, add to that body of information.

The contents of general psychology, which I selected for the course
were memory, personality and what I call general philosophy of life. The
interest in philosophy of life comes from some current and growing data
on what may be called experiential or life learning, and what has recently
been linked to the concept of wisdom. Along with utilizing accumulated
information in Psychology to examine the autobiographies, I decided also
to teach my class some skills in Comparative Inductive Analysis, similar
to that sugested by Glazer and Strauss, to see if we could use the
technique to generate some new hypotheses about adulthood.

Student and Course Characteristics The course was taught to two
psychology sections, each consisting of about 30 students. The average
age was 20 and there were fewer males than females. Each class met for
two and a half hours once per week for fifteen weeks. The course was
planned around a general project: students were to collect, organize and
analyze autobiographical data taken from individuals of different ages.
Ideally, I would have liked students to sample individuals from all periods
of life, childhood, adolescence, early adulthood, middle adulthood, and late
adulthood, but the effort would have been too intensive, so we settled on
late adolescence and early adulthood (ages 17-30), middle adulthood (ages
35-55) and late adulthood (ages 60-80) as our representative samples of
life.

Throughout the course, lecture material centered on the themes of
memory, personality and philosophy of life. Each of the first three
months was devoted to examining these topics on a separate period of life:
first, adolescence and early adulthood, then, middle adulthood, and, finally,
later adulthood. During the last month of the course we compared the data
on the three age groups in class, and discussed techniques for writing the
final paper.

Student Activities Each student's involvement in the course included
reading and listening to lectures, collecting, organizing and analyzing
three autobiographies, one per month, and writing a final paper. Class
time was offered in the first three months for pooling data on each age
sample, and in comparative inductive analyses across protocols. In the
last month, as previously mentioned, we compared in class the results
found on memory, personality and philosophy of life across the three age
samples. In the final paper, each student compared, by and large, the
results he or she had found in each of the autobiographies he or she had
collected. Students were also encouraged to discuss the results of pooled
class data. Let me describe each of these activities in mo, a detail.

Reading and Listening to Lectures Throughout the semester, students were assigned reserved readings in the library. These readings were taken from the general developmental theories of Freud, Erikson, Jung, Gould, Levinson, Vailliant, Piaget, Kohlberg and Fowler. We attempted to cover both cognitive and affective domains. Other readings focused on the nature of life changes and adjustment, midlife crisis, and life review. Regarding research methodology, there were also readings from Glaser and Strauss on Comparative Inductive Analysis. All content of the reading was reinforced in class lectures. Since the basis for student activity was the collection, organization and analysis of autobiographies let me describe these activities.

Collection, Organization and Analysis of Autobiographical Data In order to make it easier for students to collect autobiographical information, I provided them with a structured life interview of 34 questions which I had constructed. Questions 1 through 3 of the interview were meant, respectively, to elicit remembered events, next, to have the individual assess the effective quality of those events, and, finally, to assess which events were turning points, or periods of change, in the individual's life. Questions 4 through 34 were meant to elicit the individual's philosophy of life. In general, they were intended to assess the nature of life as good and bad, and fair or unfair, as seen by the individual and to assess some of the individual's ways of coping.

In order to engage the students' interests, and to familiarize them with the instruments the first assignment was for each student to administer the structured life interview to him or herself. Students went on to administer the structured life interview to another person in the late adolescent/young adulthood period, only after this practice experience in collecting data. The second step was to organize and code the autobiographical data that was collected. While question 1 of the

interview asks for remembered events, question 2 asks the individual to DESIGNATE WHICH REMEMBERED EVENTS were good, bad, good and bad, or neutral. Students were instructed to type up the autobiography, and to BRACKET OFF, AND NUMBER EACH consecutive event, and to designate the age of its occurrence next to each event. They were also instructed to code the affective quality of each event, ie., good, bad, good and bad, or neutral, NEXT TO EACH EVENT ON THE TYPED AUTOBIOGRAPHY, and to place a T along side each turning point event.

NEXT, THE STUDENT TRANSCRIBED these data to a summary data sheet and RECORDED THE TOTAL OF EACH AFFECTIVE type of event on the bottom of the SHEET. ONCE THESE RESULTS were coded and organized we began the final step, comparative analyses of results. In class, then, we began COMPARISONS OF data of the first sample on the theme of memory. We pooled data on the frequency of events remembered, of percentages of GOOD, BAD, GOOD AND BAD, and neutral events remembered, and on the FREQUENCIES OF turning points remembered across the adolescent/early ADULTHOOD SAMPLE. WE constructed frequency distributions and computed MEANS. WE ALSO WORKED AS a group to list all types of turning points REPRESENTED AND THEN CATEGORIZED them by type of life event, noting the FREQUENCIES OF EACH CATEGORY for our adolescent/young adult sample. CATEGORIES WERE GENERATED from overlap of the items remembered, for EXAMPLE GRADUATIONS, first job, etc.

FOLLOWING THE ORGANIZATION and analysis of remembered events, we USED THE SAME FORMAT in organizing the data and analyzing it for the topic OF PERSONALITY. COURSE READINGS and lectures were devoted to the theories OF PERSONALITY OUTLINED earlier. Students went back to their summary data SHEETS FOR THE FIRST AGE SAMPLE AND categorized the events in relationship to various themes of personality. Labels such as affiliation, attachment, love, intimacy, caring, giving, loss, rejection, and abandonment were used

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TO CODE AFFILIATIVE TYPE EVENTS. Achievement and autonomy type events WERE CODED AS ACCOMPLISHMENT, autonomy, independence, responsibility, ACHIEVEMENT, AND FAILURE. Identity was associated with events which EXPRESSED AN INDIVIDUAL'S concerns with gender typing, sexual roles, and BELIEFS, VALUES AND THE general question of meaning of life.. Following the coding of individual events, all events with affiliative themes, all events with autonomy themes and all events with identity themes were summed SEPARATELY. THE SUMS OF each theme were recorded, and percents computed for each individual.

ONCE STUDENTS HAD CODED the autobiographical data by these personality THEMES WE POOLED THE RESULTS again in class. The main question we asked, HERE, WAS WHETHER any one of the particular themes represented the PARTICULAR AGE SAMPLE. We also looked at variations in percentages of different themes across the sample.

AFTER THE ANALYSIS of personality, we began to use Comparative INDUCTIVE ANALYSIS TO examine some of the questions of the structured life INTERVIEW RELATED TO philosophy of life. Since various questions were GROUPED BY PARTICULAR ISSUES we discussed them in this fashion. For EXAMPLE, SOME QUESTIONS WERE meant to elicit attitudes towards life's JUSTICE OR FAIRNESS, while others were meant to elicit an individual's view about purpose or teleology of life. In the questionnaire itself these QUESTIONS WERE DISTRIBUTED rather than grouped. In order to organize these DATA, STUDENTS WORKED IN class in groups of four or five individuals on INDIVIDUAL QUESTIONS AND listed all their collected responses to the QUESTION. Then, as a whole group the class pooled data on types of RESPONSES, eliminated overlap, and recorded frequencies of each type REPRESENTED. , Next, we simplified the data into categories and tallied the FREQUENCY OF INDIVIDUALS represented for each category. For example, a question such as "Why do people believe in God?" elicited such categories

from the mid-life sample as: to improve oneself, people refuse to believe that death is the end, and, protection against evil. These compiled lists were then kept for later analyses as a representation of the thinking of that age sample.

This procedure of collection, organization and analysis of data took APPROXIMATELY ONE month for the adolescent/young adult sample. For the SECOND MONTH WE CONTINUED the same procedure of collection, organization and analysis of data on the middle aged sample, and in the third month, the SAME PROCEDURE for the later aged sample.

FINAL PAPER AS MENTIONED earlier, during the last month of the course THE CLASS COMPARED the data on memory, personality, and philosophy of LIFE, RESPECTIVELY, across the three age samples. The final paper was a WRITE UP, IN PART, and reflection on these comparisons. Actually, students WERE GIVEN ONE or both of two options for comparisons in their final paper. FIRST, STUDENTS could compare the pooled data for each sample, as we had DONE IN CLASS, and discuss the findings in light of their reading and COMMON SENSE. Second, they could compare numerical results they had FOUND REGARDING THESE topics across the three individuals that they SAMPLED FROM EACH AGE group. Third, they could do some of each. Most STUDENTS TOOK THE THIRD OPTION. All comparisons that students did for their FINAL PAPER WERE SUPPOSED TO parallel the types of comparisons we had DONE IN CLASS. FROM THESE COMPARISONS students generated hypotheses ABOUT THE NATURE OF INDIVIDUALS from different periods of life, and RELATIONSHIPS AMONG THE PERIODS of life. On the whole, I was surprised and PLEASED AT THE STUDENTS' EFFORTS and products.

IN ORDER TO HELP STUDENTS execute comparative analyses, I gave them an INSTRUCTION sheet in which I suggested some general comparisons for each topic of the course. For example, students could compare the frequencies of events recalled across age groups or across their individual samples.

Second students could compare percentages of good , bad, good/bad, and neutral events, respectively, recalled across age groups. Such comparisons could also be done for our personality categories and our categories on philosophy or meaning of life. Along with comparisons of the of various types of events recalled by sample, students were given the option to look also at these types of events as recalled by an individual at different periods of life. Obviously, one has to be judicious about choice of comparisons, since one could go on comparing as one's imagination dictates. Therefore, students were given the latitude of a number of common comparisons and a number of comparisons of their own choice. This also allowed them to stay within their own limits of understanding of qualitative and quantitative analyses.

In the last class of the semester we discussed the results of the students' comparisons. We discussed and contrasted their individual findings, and talked about those differences in the light of individual variation. We also talked about caution in interpreting results and ways to improve the study.

Problems and General Research Findings   One tantalizing part of this paper, perhaps, is the nature of our results from the analysis of autobiography. The problem is that the results of such an undertaking must be viewed with extreme caution. But it is this problem that ties together many of the difficulties in teaching which involves doing research with undergraduate students. It was really with a great sense of importance and excitement that most students approached the task of research. So often they have only been the recipients of what others have discovered.

When I began the study, my goal was to pool data from each of the three age samples, thirty subjects, per age group, therefore, from each of the two class sections, giving us sixty individuals for each age sample.

Then, in the final paper, students could compare the pooled data across periods of life. As you may remember, for the final paper, I suggested to students, that they could compare the data from the three autobiographies that each had collected and only relate their findings to those we had achieved by pooling data in class. I had to caution students on overvaluing the results we had achieved by pooling data.

Two major causes contributed to this caution. First, even though students were told to prepare certain information for a given class discussion, there was always a proportion of students whose data was incomplete for each comparison. Second, from class to class, there were always some students absent. Third, the students with incomplete data and the students who were absent varied from week to week so that the data that we compared from class to class was drawn from a changing sample even within a given age group. Students were advised as well to use caution in inferring that the results of analysis of each of their three individuals would represent a larger sample. In one way these variations worked well for us, for they provided an occasion for teaching about the difficulties in doing research, and the need for caution in reporting results.

There was also difficulty with sampling itself. Since I was interested in students' finding relevance in the project, and, in fact, finding three individuals to interview, rather than in producing refined results, I encouraged them to take their autobiographies from family and friends, and some even asked if they could analyze their own biography. Nevertheless, we also discussed the drawbacks of such sampling, not only regarding loss of the benefits of random sampling, but also the possibility of dissembling by friends and family reporting personal information.

Problems also arose in the coding of psychological themes, as some students were better than others in assimilating psychological theory

from reading and lecture. One of the benefits of the ongoing project approach to teaching, however, was that I was constantly able to monitor student progress. Material was constantly being handed in to me for correction, after each step of activity, and, if necessary, students redid their work. Since all work was constantly graded and reworking meant a possible improvement in grade, they were more than willing to rework material. Since the whole procedure of collection, organization and analysis of autobiographies was also done three times by each student, they tended to improve in technique as the course continued.

A final problem I experienced was judging how much we could actually accomplish in fifteen weeks. I found myself constantly cutting back and modifying efforts. Descriptive statistics seemed overwhelming to many students and even percents were frightening to some of them. While I tried to engage students in the construction of bar and line graphs, for some, this too was intimidating. Regarding Comparative Inductive Analyses of the responses on the structured life interview, I had far exceeded possibility in my original plans. Time and energy limited the number of comparisons that we could do in class.

Some of the general tentative results we found, however, from our various comparisons, were that across the three age groups there was no variation in the number of events recalled, but when the total sample was redistributed by decade, the oldest group, the 70 year olders, had almost twice the number of memories as the teenagers. The later age individuals recalled the maximum number of good events, and these events occurred in young adulthood. In fact, except for the adolescents, it appears that young adulthood is viewed as the happiest time of life, while the unhappiest time seems to be after seventy. As might be expected, the themes of personality in adolescence and young adulthood seemed to be most in autonomy, while those of the later years tended to be affiliation. Results

for the middle aged sample were not clear. The issues we analyzed in philosophy of life were fairness of life and purpose of life. Through comparative analysis we arrived at certain categories of responses. Adolescents and young adults appeared to judge the fairness of life events on the basis of consequences to the self, and saw causes for negative events as external to the self, whereas middle aged and older individuals tended to judge the value of events by consequences to others and even the world at large, and saw causes as more internal. These results seem to echo information found in the psychological literature on development. For example, in answer to another question, it seems that all groups believe that the world is not perfect, but for reasons why the world is not perfect the younger group tended to blame concrete events, such as, famine, illness, death, money, wars,and government, whereas the middle and older individuals tended to name psychological characteristics, such as, selfishness, greed, dishonesty, etc. as the basic causes.

I would like to conclude by stating that throughout the project, the bulk of students became quite humble about their own age group, rather than defensive, or arrogant, and surprisingly to me, respectful of the process of aging, and excited by the knowledge and attitudes of older people. Some students spontaneously told me that interviewing people of different ages had opened up a whole world of knowledge to th In this regard, the experiment was a highly rewarding one for me and, apparently, for many of my students, since it seemed to affect them at a level that was deeper than impersonal academics.

MICROCOMPUTERS IN A PERSONALIZED SELF INSTRUCTION COURSE

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March 25, 1988

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ABSTRACT. The Personalized Self Instruction (P.S.I.) course methodology is discussed, and the advantages of integrating this method with microcomputer demonstrations illustrated. These include increased student motivation, enhanced learning, and a gain in teaching cost-effectiveness. The specific programs are described and their place in the format of the overall course delineated.

MICROCOMPUTERS IN A PERSONALIZED SELF INSTRUCTION COURSE

March 25, 1988

Morton Isaacs

Many different approaches have been proposed to try to achieve the objective of both increasing the quality of college education and restraining its cost. There has been a growth of oversize lecture courses, classes taught by graduate students rather than professors, and classes taught over computer networks with little or no student interaction.

Approximately twenty years ago, a method of instruction called a Personalized System of Instruction (P.S.I.) was proposed (Keller, 1968), and applied to college teaching by Johnston and Pennypacker (1971) and McMichael and Corey (1971). We designed and taught an Introduction to Psychology class based on this method (Isaacs, 1973) and found that, despite the many advantages of this method, some strong disadvantages were manifest. Over the years many of the drawbacks have been eliminated by integrating microcomputer demonstrations into the framework of the course.

In the past nine years more than 175 students per quarter have taken the Introduction Psychology P.S.I. course, totalling more

than 5400 students over that time period. Evaluations collected at the end of the course show that the students enjoyed the method and the course more than they did conventional lecture courses, and that their level of learning was as high or higher than in these courses. In addition, faculty involved in teaching the course have indicated that they find it exciting and interesting to teach.

P.S.I. METHODOLOGY

The P.S.I. method is based upon mastery learning principles, the most important of which may be summarized as follows:

1. Material should be presented to the learner in relatively small increments rather than in large chunks of diverse material.

2. There should be objective measurement of learning, with the criteria for adequacy clearly stated prior to the testing.

3. There should be feedback to each student of the correctness and adequacy of his learning as soon as possible after the student feels prepared in the subject material.

4. There should be positive reinforcement for correct learning but little or no punishment for failed learning. Generally, this allows the student to correct learning errors and to reattempt to demonstrate mastery of the material without penalty.

5. The pacing of learning should be in the hands of the student rather than in the hands of the instructor; students should within certain limits be allowed to proceed through the course as quickly or as slowly as they wish.

THE ORIGINAL P.S.I. METHOD

In Keller's plan, students receive course material which they study on their own. When they feel prepared to take an examination on one of the modules they may do so; the examination questions are multiple-choice, with immediate grading of the exam and its return to the student. Grading is generally on a "pass-fail" mastery basis, where failing the test means that the student must retake it until she passes before getting credit for the module; if the student passes on a subsequent test, the original failure is eliminated. Students can take as long as they like to study the material; course grading is based upon the number of modules completed regardless of how long this takes. The advantages found for this method are as follows:

1. Students can individually pace themselves, so that those who have had previous experience with the subject matter

or who can absorb material more quickly than the average student can move through the material faster, while those who need more time to absorb it can take it without being penalized;

2. A student cannot fool himself or the instructor into believing he knows material when he doesn't, since he must demonstrate knowledge of the material before being allowed to continue to new material.

3. Much of the test anxiety experienced even by excellent students is lessened, since "failing" a test does not permanently injure a student's record. This permits the student to use examinations as learning experiences rather than only evaluative challenges.

However, in the first trial of this method we found some severe disadvantages:

1. Students complained that there was too little interaction between themselves and the instructors, and no interaction between themselves and other students.

2. Some students complained that all they did was read written material. this was boring, and they reportedly had to force themselves to do it. They desired more active course involvement.

3. The registrar was unhappy at the number of "incompletes" at the end of the official quarter. and wished the normal time limits to complete a course reimposed.

MICROCOMPUTERS AND P.S.I.

Based on the feedback from the students, we redesigned the course, jettisoning some of the original concepts to answer the students' (and the registrar's) complaints; we therefore renamed the course "Personalized Self Instruction". retaining the same initials as Keller used but emphasizing the individual's role in his own education.

The most important of these changes introduced short. interesting psychological demonstrations which run on a microcomputer. and which serve to increase the students' activity and involvement in the course.

Teaching ourselves BASIC programming on the Apple II+ (subsequently expanded by one of the instructors learning 6702 assembly language), we designed and wrote a set of psychological demonstrations. which at the present consists of 14 microcomputer demonstration programs, and 26 other demonstrations not on the

computer. Each module has at least three demonstrations (and some as many as nine) associated with it, designed to create interest and illustrate material in the module. Although some of the ideas for demonstrations were suggested by previously published concepts, many were original creations on our part or as a minimum greatly modified from previous suggestions. The modules and the programs associated with each are listed in Appendix A. along with a brief description.

Students receive a workbook when they enroll in the course which contains an explanation of the course method and grading, and introductory material to the laboratory demonstrations. Prior to receiving any course material, however, they must sign up for the first set of psychology demonstrations. Each demonstration (with the exception of the Social Psychology ones) is designed to be run by an individual student; the Psychology Lab in which the microcomputers and other material is placed can accommodate fifteen students at one half-hour session. Six sessions are held per day, five days a week, with a student assistant available to help distribute material and ensure that the equipment is cared for.

When students enter the lab room, they are given an introductory sheet which tells them in general terms what the

experiment is about and what to look for during each of the demonstrations they will be doing. No computer skills are needed: a demonstration begins when a student presses a keyboard letter assigned to that demonstration. Each demonstration requires active involvement from the student, which may take the form of pressing keys on the keyboard to change the computer screen display, or inputting decisions or information into the computer, or trying to "beat the computer" in some kind of game.

After the student has finished all the demonstrations for the module, she is given an Explanation Sheet that describes in psychological language the purpose of the demonstration, the different responses that could be made and their meaning, and some clues to the place of the demonstrations in the module. She is also then given the actual module material to read at her convenience.

When the student is ready, he comes to a testing room where he is given a multiple-choice test on that module on a "pass-fail" basis; e.g., the grade of the module test is irrelevant, the only relevant fact being whether the student has reached the minimum level of proficiency required to continue on to the next module (12 or more correct answers out of the 15 questions). Each test contains

three review questions on information from previous modules, so that cramming will not generally be a successful strategy to pass module examinations. Five different versions of each of the examinations have been created. and a different one is offered every test period, so that a student cannot pass the course by memorizing specific answers to specific questions.

The function of the instructors in this type of course is to serve as resource centers for the students. Students are encouraged to ask questions about the material in the module or what was learned from the demonstrations prior to taking a module test, during the test can ask that a test question be restated if they find the question confusing, and most importantly, after receiving their graded answer sheet back, they can (and do!) challenge the keyed answers to questions, or ask for explanation why the answer they chose was incorrect. while they still have their question sheet and answers in front of them. The instructor therefore is always teaching one-on-one with individual students who have requested assistance, and can tailor answers to meet the level of the student's questions or comments.

After successfully completing all eight modules, the student takes a comprehensive fifty-question multiple-choice examination

covering all the course material. A score of 92 or higher results in an "A" for the course, 82 - 90 in a "B", and so on. The comprehensive may be retaken once and the higher grade is the one assigned. The student must complete the modules and take the final ex..mination prior to the end of the quarter or she receives an "F" for the course. "incompletes" are given only for medical emergencies.

ADVANTAGES OF THE PRESENT P.S.I. COURSE

The present course using the microcomputer programs has these advantages over the original format of the course:

(1) Students enjoy the programs; they have added a much-needed active component and interest to the course. Students have asked if they could bring in their friends to "run through the demonstrations even if they're not in the course". The students interact with each other during the demon..trations, breaking the isolation of the traditional P.S.I. course.

(2) The demonstrations are vivid and hence often remembered more easily than the written module material.

Referring to the demonstrations while answering questions on the module material turns out to be a speedy, helpful way for the instructor to clarify concepts.

(3) The demonstrations give an alternate route of exposure to much of the information in the module. Receiving the information behaviorally as well as cognitively aids in memory retention.

There are no major disadvantages to the use of the demonstrations other than logistics. It is necessary to have lab assistants to help run the laboratory, set up the equipment, pass out the modules, etc., and of course it is necessary to make the initial investment in the microcomputers to conduct the laboratory. These expenses, however, are more than offset by the cost-effectiveness of the numbers of students who can take the course at the same time, and by the increase in learning and enjoyment evidenced by the students. We normally have 210 students enrolled each quarter, with two faculty and three laboratory assistants to conduct the course. We have recently added graduate psychology students to help tutor slower or less verbal students, and found that this has improved the number of students who actually remain to the end of the course.

Perhaps the best evidence for the course's effectiveness is how often we are asked the question, "Are there any other courses like this offered?", to which we must regretfully answer "No". There is a great deal of work required to create and design programs, set up and run a laboratory, and create all the questions for all the exams required by this method, and despite its success colleagues in other areas have not been enthusiastic to duplicate this in their area.

Readers interested in more detailed information required to actually conduct this course may write to us for further information.

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APPENDIX

BRIEF DESCRIPTIONS OF EACH OF THE P.S.I. MICROCOMPUTER

DEMONSTRATIONS

Sensation/Perception Module

Attention: The computer presents a white square in the center of the screen on which the student fixes his attention. Four words then appear briefly in the corners of the screen, and the student tries to identify them. He can increase or decrease the length of exposure time of the words by pressing a key. The object is to illustrate that attention switching takes time although we're not normally aware of it.

Gestalt Closure: The computer starts with the screen blank: each time the student presses a key another row of blots appear on the screen from the top down. The student is to try to identify what image is formed by the blots. The object is to show the restructuring of organization that takes place when a gestalt is formed of what had previously appeared to be unconnected blots.

Common Movement: Letters appear continuously scattered over the screen and then are erased. However, one set of letters retains its relative distance and common movement pattern relative to each other; the students stare at the screen until the word formed by these letters "pops out" at them.

Phi Phenomenon. A juggler appears on the computer screen who appears to be juggling various balls. The student can press one key to "increase" the juggler's speed, another to "slow it down". He is asked to count the number of balls which appear to be present at each of several speeds. The object is to show perseverance of the ball's image and how perseverance accounts for the apparent increase in the number of balls as the speed of the display increases.

Memory Module

Sensory Memory: When the student presses a key, a letter appears on the screen for a very short period of time. It quickly disappears, and the space where it had been is immediately surrounded by a circle. The student is asked to name the letter. The student can affect the speed of the presentation by pressing appropriate keys.

The object of this demonstration is to show that objects must be labeled before they can be remembered, and the labeling process takes time.

Memory Matching (STM): Two letters are presented on the screen simultaneously, which can vary in two dimensions: the letter may be upper- or lower-case, and the letter may be an "A" or a "B". The student keeps his fingers on the "S" key (for "Same") and the "D" key (for different), and if both letters are either upper- or lower-case A's or B's he is to press the "S" key; if they are different letters he is press the "D" key. The object of the demonstration is to show that it takes an additional step to process images which differ both in shape and in meaning than it does to process images that differ in only one regard.

Capacity and Chunking (STM). Individual numbers are displayed for one second each at the same location on the computer screen. The student was to try to remember the set of numbers in order and to input them into the computer when asked to do so. First the studen+ was asked to input a five number set, then seven, nine, and twelve number sets. After the set of twelve (on which almost all students made errors), they are told that they will again be presented wit'. the twelve numbers, but they will find it easier to

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memorize them if they organize them in terms of three chunks: when Columbus discovered America, when the American Revolution began, and the date of the current year. The twelve digits are then redisplayed, and this time few students make any errors. The object of this demonstration is to introduce the concept of "chunking" as an organizing tool in Short Term Memory.

Learning Module

Operant Conditioning: The student is presented with a "mouse" drawn on the screen inside a border, and is told he can give the mouse food by pressing the "R" key (for Reinforcement), or administer a shock to the mouse by pressing the "P" key (for Punishment). She is warned that too much food will satiate the mouse, while too much punishment may cause the mouse to freeze and stop moving; in both cases, the student then would have to get a new mouse. The student is told that punishment tends to suppress a wrong response but not to lock in a correct one, while reinforcement tends to strengthen the correct response but also strengthen responses similar to it. The student tries to get the mouse to go through a goal at one end of the box. At the beginning of the sequence the mouse is equally likely to move in any direction; with proper conditioning, the mouse will learn to move

through the goal. The object of the demonstration is to teach the effects of reinforcement and punishment, the concepts of generalization and discrimination, and to reveal the existence of the response hierarchy upon successful completion of the conditioning.

Intelligence Module

Cognitive Structuring: The computer displays various mathematics, counting, logic, and visual problems in the center of the screen, one at a time. The subject can examine the problem as long as he wants, then records his answer in an answer sheet in the workbook. After completing the demonstration, the problems reappear with the correct answers indicated, and a listing of the number of persons to that point in time who gave various of the possible answers to the questions. The object of the demonstration is to introduce them to the concept of hemispheric dominance by indicating some of the differences in the thinking processes of right-mind dominant and left-mind dominant persons.

Artificial Intelligence: The subject is asked to pretend that he has come to a therapist with a problem and to respond to the "therapist's remarks"; the computer takes the role of a nondirective

therapist, often reflecting the subject's input and occasionally offering warm support or friendly words. This demonstration is based upon "Eliza", one of the first Artificial Intelligence (AI) demonstration programs created. The object is to give the subject a feeling for what an AI program can be like, both its advantages and its disadvantages.

Motivation/Emotion Module

Achievement Motivation: The computer places a square of light at the top of the screen, which will fall toward the bottom at some point after the student has indicated he is ready. The student can "catch" the square by pressing a key while it is still on the screen. The subject is asked to choose how fast the square will fall; the faster the rate of fall, the more points he will receive if he catches it. He is given five trials to try to accumulate the highest score he can. The object of the game is to illustrate the Need to Achieve, and to discuss the concepts of Fear of Success and Fear of Failure that might lead students to choose different patterns of speeds than those used by people high in nAch.

Context of Emotions: The computer presents a story to the student line by line; after each line the student is asked to guess what

emotion the subject of the story is feeling at that time. The story adds details which change the meaning of the behavioral expression of the emotion the person is putting forth. The object is to emphasize how interpretations of emotions depend not only on the objective facial expressions or behavior of the individual but on our interpretation of the meaning behind the behavior

Biofeedback: A program was written which takes input from two electrodes attached to the student's fingers, measures the current flow as a consequence of skin resistance (the Galvanic Skin Response reading), and displays the result on the screen in the form of a graph line. The subject first is directed to try to relax for several minutes; when she has done so, a fellow student (or the lab assistant) asks the subject a series of 3 questions, on one of which she is directed to lie. The fellow student then tries to identify which question was answered by a lie based upon sudden changes in the graph. The object is to illustrate one of the devices upon which the "lie detector" is built and to demonstrate biofeedback and biofeedback mechanisms.

Abnormal Module

Rorschach Inkblot Test: A simulated Rorschach inkblot is handed to

the student who is to write down in the workbook as many different images as he "sees" therein. When he has finished. he is directed how to analyze his own responses into whole-part, movement. and color responses. These are then input into the computer, which, based upon a very simplified AI system, then prints out an "analysis of the person's personality" based upon his answers. The students are warned that this is only a demonstration of the way in which projective tests are scored and not to be taken too seriously. The object of this demonstration is to give the student some understanding of the difference between objective and subjective testing, exposure to a projective test. and some idea of what persons who use these as tools look for in their analysis.

Interactive Computer Testing as an

Effective Learning Tool

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INTERACTIVE COMPUTER TESTING AS AN EFFECTIVE LEARNING TOOL

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Testing is often viewed as nothing more than a necessary evil by student and professor alike. This topic which brings frowns to most faces, can instead bring words of appreciation from students as well as increased knowledge. All we have to do is practice what we preach when we teach psychology.

A test is a perfect learning situation for most students. This is the one time we can count on having the student's ATTENTION. We can capitalize on this opportunity by utilizing immediate feedback to maximize the likelihood of fixing the correct answer in memory.

Until the explosion of microcomputers, providing immediate feedback was easier said than done. For the past five years, I have been successfully using interactive computer testing where students find out the correct answer to a question as soon as they have finished answering it. I do this with minimal computer facilities. (We have 15 computers set up in a regular classroom.)

There are several advantages that accrue from this technique from the students perspective. They enjoy the novelty of the immediate feedback. It challenges them--almost like a computer game. Sitting at a computer, reading the questions and answers at eye level instead of being hunched over a desk trying to fill in little circles or squares on a Scantron form allows for better posture, fewer headaches--a more relaxed body. This goes hand-in-hand with better concentation. They also like knowing where they stand at any point during the test and as soon as they are finished.

For the professor, once set up, this system is faster, easier and more flexible. The computer does the scoring and the potential exists for any kind of item analysis desired. Since students do not handle tests or answer sheets, security is much better than with paper-and-pencil tests where questions and answers can "wa k out." Students do not know how to access any particular version of the test. Each student is taking a different version of the test (easy to do with the computer) than the person sitting on either side of him/her so noone tries to cheat off of his/her neighbor. There is no paper (except in the printer) so "crib sheets" cannot be brought in, etc.

Students appreciate this type of testing/learning method. On anonymous evaluation forms, students

consistently volunteer that they LIKE these tests! Below
are samples of comments received:

"I like the tests because you learn as you take it."
"Taking the tests on the computer was new to me but I
 found it more relaxing."
"I like computer tests a lot better than Scantron.
 They let you focus on one question at a time for one.
 Also it is a lot less intimidating .....it is good to
 know what the right answer was so you can learn from
 it."
"I felt that taking the test on the computer was very
 beneficial. I learned a great deal more this way than
 the 'normal' way of taking tests."
"...it made me realize I'm not a very careful test
 taker. This form of testing helps you learn to be
 more careful and read questions more carefully."
"I like having a test on the computer. I wish other
 teachers would give tests on the computer also."

There are several features that have proven desirable
and have been incorporated into my tests over the years. In
addition to the immediate feedback, students like having the
option to see a running score (or not), the opportunity to
skip a question (and have it come back up at the end), the
opportunity to review questions answered incorrecly at the
end of the test as well as at the time they are originally
answered. One can also allow two tries per question (giving
half credit for a correct answer on the second try).

From my perspective, my job is to help students learn.
Why overlook a very powerful opportunity to do just that?!

A First: A Psychodrama Course

As Part Of An Undergraduate

Psychology Curriculum

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Running Head: UNDERGRADUATE PSYCHODRAMA

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Abstract

This article reports on a psychodrama course
offered for the first time as part of the
undergraduate psychology curriculum at the
Lock Haven University of Pennsylvania. The
growth of the students in the course, on both
a personal and an educational level, is
discussed. Students reported changes in the
areas of empathy, knowledge of self, self
esteem and self confidence, perception of
control, risk taking, willingness to self
disclose, and relationships. Goal setting
and career decisions were also enhanced.
Because of the positive outcome of this pilot
course, psychodrama is now part of the
psychology curriculum at Lock Haven
University.

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A First: A Phychodrama Course As Part Of An
Undergraduate Psychology Curriculum

A university offering an undergraduate
course in psychodrama appears to be rare.
The following article reports on such a
successful incorporation. The author's
review of the literature reveals psychodrama
courses offered at the graduate level or as
part of a in-house training program in
hospitals and clinics (Kranz and Houston,
1984; Naar, 1983; Treadwell, 1981) and an
occasional course in psychodrama as a one-
time offering for personal enrichment or for
experimental purposes (Carroll, 1979; Kipper
and Ben-Ely, 1978). However there was no
citation of such a course included within a
psychology undergraduate curriculum. In the
Fall of 1986, Lock Haven University offered
an undergraduate course in psychodrama. This
course was taught by a faculty member who is
both a licensed psychologist and is certified
at the practitioner's level in psychodrama,
sociometry, and group therapy.

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The psychodrama course was sixteen weeks
in length and met twice a week for seventy-
five minutes sessions. Often, however, class
time was extended by choice of both students
and instructor. Because there was no stage
available on campus, the setting was a large
rehearsal room in the fine arts building.
The room was painted black and equipped with
theatre lighting, moveable platforms,
flexible seating and a stage area. The
class was composed of six female students,
five of whom were senior psychology majors.
The sixth was a senior speech and
communications major.

The course's format was designed to
facilitate both experiential and didactic
learning. As part of the didactic experience
a text book by Starr (1977) and a variety of
outside readings were assigned. Part of each
class period was spent discussing topics
covered in the readings, i.e., doubling,
sociometry, and role playing. The remainder
of the class session was used to put into
action what had been discussed previously.
It was the instructor's intention to use the

didactic portion of the class as a warm-up to the required action theme of the day.

Grading for the course was objective and subjective. It was based primarily on two criteria. The first was class attendance and participation. The second was a final examination made up of two parts: the ability to didactically explain the various important elements of psychodrama to which the student has been exposed within the class, and the ability to put into action these previously explained elements. Each student was given an opportunity to direct a session but was not graded for this particular effort.

Method

The findings reported below were not the result of a controlled experimental investigation into student changes resulting from this course, but rather were collected through careful observation. The implications of this article would undoubtedly be stronger if the intervention had been studied in a more controlled, experimental fashion; however, despite

statistical limitations, it is felt that these observations could serve as a valuable source of reference for further, more in-depth, research.

Each student was interviewed individually after the last class of the semester, after grades had been assigned. All interviews were conducted by the instructor and were about ninety minutes in length. Students were asked specific and open ended questions and were encouraged at the end of the interview to add their own observations. Three areas were covered in the interview: specific knowledge acquired from the psychodrama experience; changes in their personal lives attributed to class participation; and changes observed in other students in the class. Also included in the interview were the specific psychodrama techniques perceived as most instrumental in the aforementioned observations.

Results

Most students reported feeling unsure and anxious during the first four weeks of the

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course, This uncomfortableness was attributed to the following factors: the class' format was a radical departure from the usual lecture format familiar to the students, and this was the first experience with an application of a specific therapy for five of the students, Participation in class was voluntary, and students reported an internal expectation to participate and to take responsibility for the success of each session after the first few weeks, Although nothing was stated by the instructor about absenteeism, minimal absences occurred, Students reported a realization that their presence was an integral and important part of the group's experience,

The authors observed that after the first two to three weeks students showed much less anxiety; were more willing to participate as a protagonist, an auxillary ego, or a double; and communicated more meaningful aspects of their personal lives during the sharing phase of the psychodramatic session, Over the next eleven weeks changes were both observed by the authors and reported by the students in

the followi   as: empathy, knowledge of
self, self esteem and self confidence,
perception of control, risk taking and
willingness to self disclose, and
relationships. It was reported by all six
students that the most significant changes in
all of these areas occurred in the last six
weeks of the semester. Although this class
was not a therapeutic group, the development
of the psychodrama class paralleled the five
stages of group development described by
Tuckman and Jensen (1977): forming, storming,
norming, performing, and adjourning.

Empathy. All six students reported that
they were more capable of empathizing with
others in the class as well as significant
others in their social atom. One student
stated "I'm more perceptive to how others are
feeling, I can see things now from their
point of view", while another remarked
"...When I doubled someone in class I
mimicked their physical posture and it helped
me to feel what they were feeling. Now I pay
much more attention to nonverbal signals and
am much more aware of what others are

feeling". Particular psychodramatic
techniques that were reported as significant
in intensifying growth in this area were:
doubling, role reversal, mirroring, and
playing auxillary egos. This finding agrees
with Kipper and Ben-Ely (1979) who found the
use of the psychodramatic double a more
effective method of empathy training than the
reflective or the lecture method,

Knowledge Of Self. All six participants
reported gaining greater awareness of self
and how they affect others. Personal
strengths that students were initially
unaware of became vividly evident as the
class progressed. Self-perceived
inadequacies and concerns about one's self
image became less hidden and more accepted as
part of the total self. As one student
expressed "...Through role playing, doubling,
and mirroring techniques used in class I
began to feel much more in touch with my
feelings. I felt a balance surfacing, a
center_dness." Another student stated "I'm
more aware of what I really feel and the
roles I've been playing, and why I've been

playing them...because I've seen how others react to role demands, I'm not so hard on myself but feel confident I can change my responses to role demands". Particular psychodramatic techniques that were reported as significant in gaining greater understanding of oneself were: role playing, role reversing, being doubled or mirrored, and sociometric techniques such as drawing one's social atom.

Self Esteem And Self Confidence. Initially the students reported feeling disconnected from other class members. As the class progressed, members became not only more interconnected with each other, but concerned with the group as a whole. This building of group cohesion seemed to coincide with the individuals gaining greater self esteem and confidence in personal abilities. Class members reported that by the end of the sixth week they felt committed to the effective functioning of the group, pride in group membership, and satisfaction with their role in the g.oup and their newly acquired therapeutic skills. This finding is

consistent with Narr's (1976) study in which psychodramatic techniques were used to teach therapeutic skills to undergraduates. The Personality Orientation Inventory administered in the Narr study indicated positive changes in the area of self regard and self acceptance.

One student expressed increased self esteem and self confidence of the class by stating, "I see the group being supportive and honest and working very hard, I see everyone growing because of the work done, and I feel very proud to be a part of it..I feel we're doing this, we're making this happen'." Particular psychodramatic techniques reported as significant were: role playing, participation as a protagonist, auxillary ego, director, and action sociometries.

Perception Of Control. All six class members reported that their locus of control moved from a predominantly external basis to a more internal one by the end of the sixteen weeks. In this regard, they felt more confident in their own decision-making

processes and their ability to initiate

appropriate assertiveness in interpersonal

relationships. Goal setting became easier

and clearer as members became more certain of

their decision-making abilities. One student

stated "I have more inner strength, and am

more comfortable and confident in making my

own decisions". Another student stated "I

now have confidence in taking responsibility

for my decisions...I feel more control over

my goals." Particularly helpful in moving

toward inner directedness were the following

techniques: greater understanding of role

theory, increased role repetoire, unlocking

role rigidity, doubling, and being doubled.

Risk Taking And Willingness To Self

Disclose. Initially all six class members

were cautious in relating to others and in

disclosing private personal aspects. As

class progressed, members became more

spontaneous in their ability to express

feelings and perceptions that were previously

kept carefully hidden. The discovery that

other class members were supportive of their

self disclosures reinforced further

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exploration of these feelings and perceptions. A student remarked "I feel more open, more willing to express and experience my emotions. I take more risks now and more responsibility for situations." Another student stated "I am no longer afraid to be open and honest about my feelings with those closest to me." Important in this process was the time spent in sharing at the conclusion of each class session. Very often class members discovered that they were not alone with their particular situation but that others in the class shared similar experiences. Particular psychodramatic techniques that were helpful in risk taking and self disclosure were the use of rehearsal, future projection, role reversals, the use of doubling, and sharing at the end of each session.

Relationships. The class stated that psychodrama was helpful in clarifying important elements of their primary relationships. These elements related to the roles played and the consequences of the demands presented. The theme of

relationships constituted a considerable portion of class time as members all had unfinished business with at least one significant other in their social atom, e.g., husbands, boyfriends, children, and parents. All students reported that because of their psychodrama experiences their relationships became more honest, open, and direct. Three class members reported ending former and beginning new romantic relationships. One class member stated "I'm much more aware of role expectations and meet role demands in more authentic ways...I don't get sucked into playing a role out of habit. I feel more creative in interpersonal relationships--more hopeful in the roles of mother and wife." Particular psychodramatic techniques that facilitated greater understanding of relationships were role reversal, expanding and extending roles, doubling, and sharing.

Educational Changes And Insights. Five of the class members reported this course as their first exposure to an actual psychotherapeutic tool. Psychodrama provided an opportunity for them to become involved

both didactically and experientially in the
therapeutic process. The class members
realized that learning and feeling
comfortable with a particular therapeutic
stance was not an easy process and required
more than theoretical knowledge. In fact,
psychodrama was hard work, an example of
which was "thinking in pictures", a
particular skill that the students had not
been exposed to previously in their
education. The five psychology majors stated
that this skill was a very valuable and
enlightening element in the course because in
learning it they realized the kind of
perceptive stance needed in their future
clinical work. One student remarked "For the
first time since I had chosen psychology as a
major I realized, in very concrete and
meaningful ways, what exactly clinical
psychologists do, what skills are needed, and
how very important it is for a psychologist
to be an open, self actualizing, growing
person. I feel much more focused now, more
certain of the direction in which I'm going."

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Future career goals for the class became
more well defined. One member was accepted
in a Master's program in dance therapy. She
reported that taking psychodrama was helpful
in confirming her career choice and enabled
her to compete successfully at the audition
for entrance into the program. Another
member has applied for entrance into a
Master's degree social work program; her
experience in psychodrama gave her confidence
in her abilities to succeed in her career
choice. A third class member who recently
graduated is now looking for a position in
mental health and remarked that since taking
psychodrama she feels more confident in her
ability to deal with psychiatric patients.

A fourth student decided to incorporate
psychodramatic techniques into her graduate
research in medical psychology. The fifth
student switched her major emphasis from
psychology to philosophy, an area that she
had been previously afraid to pursue..."I'm
very glad I took this class because it helped
me to realize that I really don't want to be
in clinical psychology, I want to teach

philosophy. And I gained the confidence to act on this realization." The last class member is currently working in hotel management and feels her psychodrama experience has helped her in dealing with co-workers and customers.

Discussion

The initial offering of psychodrama as part of the undergraduate psychology curriculum at Lock Haven University appears to have had a positive outcome for both the undergraduate psychology program and the student participant. This teaching process enhanced the students' curricular experience by providing direct, hands-on experience. They were able to integrate the didactic and the experiential and in so doing, psychodrama, and psychology, came alive.

The students also benefited personally from the psychodrama experience. Increased self confidence, maturity, and inner directedness were observed in their willingness to self disclose, to take risks, and to assume responsibility for their behavior. They also reported being more

spontaneous, more comfortable with their
emotions, and expressing greater honesty in
their personal relationships. All six
students rated the entire class experience as
excellent and expressed the hope that similar
classes would be offered on a regular basis.

The authors are aware of the limitations
of drawing conclusions from these results
because of the small sample size. This was a
first offering and as more students enroll in
the psychodrama course in the future, more
definitive conclusions concerning the
benefits of the experience can be determined.
Preliminary results from the pilot study
indicate that with the inclusion of
psychodrama in the psychology program,
students will have the opportunity for direct
exposure to a viable therapeutic technique in
which they are a participant, observer, and
discussant. In addition, the opportunity
will also be provided to experience stages of
group development, such as those described by
Tuckman and Jensen (1977). Such an
opportunity is perceived as an enhancement of
the undergraduate curriculum in that it

provides not only an integration of

therapeutic technique and didactic learning,

but also the opportunity for the development

of personal attributes and understanding of

group process that can be integrated into the

classroom experience.

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Developmental Strategies for Teaching Developmental Psychology:

One Teacher's Experience

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Background and Rationale

Perry (1970) and Belenky, Clinchy, Goldberger, and Tarule (1986) have described the intellectual journeys of young adult men and women, largely in the context of institutions of higher education. Perry's scheme traces intellectual development in college students from a position of dualism in which right answers and truth are expected to be gifts from all-knowing experts, through transitional positions in which a student argues that all opinions are equally right, to more sophisticated positions in which logic and contextual analysis form the basis of the evaluation of ideas. Many studies have documented the fact that the thinking of first-year undergraduates commonly falls in the transitional positions--perspectives which emphasize learning through direct experience and knowing through intuition (Kalinowski, 1987).

These theories have given rise to a number of teaching strategies (Maher, 1985; Widick and Simpson, 1978). These developmental teaching strategies often stress students' active consideration and analysis of their own experiences and those of others in the educational process. The teaching strategy to be discussed in this presentation was designed to introduce the idea of intellectual development in the college years to first-year undergraduates who were not majoring in psychology. It encourages students to consider both their own and others' intellectual positions and educational experiences. Coming in the midst of an introductory life-span developmental course, the focus on a topic which is central to the age of the students,

presented using a developmental teaching strategy, holds the potential for a powerful impact on the students' lives.

Method

Subjects:

The subjects in this study were students in two sections of an introductory developmental psychology course. The vast majority of students in this course were first-year undergraduates majoring in fields other than psychology. Section One was comprised of 101 students; 27 students were enrolled in Section Two. Over a third of these students (N=50) volunteered to participate in the study: 36 students from Section One and 14 students from Section Two. Participation rates by sex ranged from a low of 23% of the 39 men in Section One to a high of 57% of the 7 men in Section Two. All but one of the 50 volunteers were traditional-age college undergraduates.

Description of the Teaching Strategy:

All students in the course were asked to complete this assignment:

You are to ask two college undergraduates to write a short anonymous essay on the following topic:

Describe your best recent learning experence--in or out of a classroom. What did you learn? What was about the learning experience that made it so good? Was a "teacher" involved? What role did this person play in your learning?

After the student has written the essay, read it and discuss it with him/her. Do you understand what the student was trying to say? What aspects of learning does the student value? Try to understand why certan types of learning are important to this student.

When you have collected two essays, think about them both. What are the differences and similarities between them?

A brief reading assignment on the Perry scheme from the class textbook was also required.

One 50-minute class period was devoted to an analysis of the data collected by the students and an introduction to the works of Perry and Belenky et al. The lecturer starts by presenting two hypotheses for consideration: 1) that different perspectives on education would be seen in the essays written by different students, and 2) that differences by sex and year would be discernable. Discussion begins with students sharing some of their essays, which are summarized and noted on the board. Students are then asked to look for patterns of similarities and differences among the learning experiences that were described. The two hypotheses are evaluated on the basis of the data.

A presentation follows which describes Perry's longitudinal study of college students, his interview method, and epistemological positions. The emotional impact of intellectual development in college is described and considered using a song from The King and I, "It's a Puzzlement". The question of whether college teachers should use Perry's scheme in their teaching and class design is raised. The Perry scheme is then compared and contrasted with the findings of Belenky et al. from their cross-sectional study of women's ways of knowing.

The class presentation ends with a consideration of theory-building in psychology. The essays are again considered to see if and how they fit with the epistemological models discussed. Points of congruity and mismatch are discussed.

Data Collection:

Students who wished to volunteer for the study and receive extra credit in the course were asked to attend a brief evening meeting. At this time they completed anonymous questionnaires which consisted of 15 objective questions on the work of Perry and Belenky et al., and 4 essay questions concerning their reactions to the assignment, the presentation, and the material.

Results

The Classes:

Although I approached the classes fully convinced that this open-ended, experience-validating exercise would enhance learning, my diary notes going into the presentation discussed my concern that it would not be an easy task to "let conclusions emerge from dangerously disorganized data". I tried to prepare myself for the students' essays by thinking of ways to visually organize the material on the blackboard.

It turned out that the presentation of this material filled 1.5 class periods. About nine essays were shared and considered in each of the sections. The accounts of best recent learning experiences ranged from descriptions of particular classes and dealing with roommate difficulties to coping with a life-threatening illness. Aside from this, the experience in the section of 27 students was quite different from that in the lecture hall with 101 students.

In the small class we divided the essays into "school" versus "hard-knocks" learning experiences. With the four essays that involved classes, it was easy

to see that different students valued different ways of learning, but no patterns by age or sex could be discerned. The class seemed to go smoothly.

This was far from true in the large section. Students appeared less willing to share their essays than the students in the smaller class. When I tried to elicit a range of "school" learning experiences to facilitate later comparison with the theories, the students complained that the assignment had been too vague and that out-of-school experiences were also important to consider. After a few more stories were shared, a group consensus on ways to categorize the similarities and differences in the essays was almost impossible to reach. One exasperated student called out, "Give us your point and we'll argue about it". I responded that the point this time was not to argue but to cooperate, to share ideas, and to come to a shared understanding. The presentation proceeded smoothly only when I began to present the Perry model.

The Questionnaire Data:

On the objective questions, the number of correct answers exceeded those expected on the basis of chance (492/300). All students recognized the truth of the statement that "A student's intellectual position can influence his/her choice of schools, classes, and learning experiences".

The majority of the students (56%) reported positive reactions to the assignment. Some (22%) had mixed responses and 20% responded negatively. Positive statements ranged from "It was easy." and "I enjoyed it." to "At first I took my time getting them because I thought it would be boring. Once I collected two I found their responses really interesting so I collected

essays from two other friends just to see their responses. I found the
similarities and differences between the responses to be very interesting."
Mixed and negative responses described a discomfort with asking friends to
write essays and frustration that friends did not want to do it.

A similar majority (54%) of the students wrote that collecting the essays
had a positive effect on their participation in class discussion and
understanding of the presentation. Students said the essays made the
presentation interesting, easy to understand, and personal. Some reported
feeling more at ease and able to participate. Generally negative comments
were received from 22% of the students. Five students from the large class
mentioned that the discussion got "out-of-hand". Four additional students
from that section mentioned that confusion stopped them from participating.
Two students from the large lecture felt the material was too personal and
sensitive to be discussed in that way.

Many of the students (87%) mentioned that they found themselves thinking of
their own best learning experiences or their own intellectual position. Some
students (13%) did not do so, mainly because they were too busy trying to
relate to the experiences of other people.

A number of students (52%) discussed the positive impact knowing this
material would have on their college studies. Many mentioned they could apply
the theories to everyday situations and would now think about the
circumstances that facilitate their learning. Five students saw Perry's
theory as a guideline giving them something to strive toward. Four students
said they would be more open to others' ideas and different perspectives. One

student mentioned gaining a sense of objectivity. On the other hand, 24% of the students specifically mentioned that the material would not have an impact on their studies. Some reported confusion about the theories, others did not want to take the works "too seriously". They approached the material as something to be learned for class.

Discussion

The preponderance of positive responses to this teaching strategy supports its developmental validity and encourages me to continue teaching and working in this direction. The exercise seemed particularly effective in sensitizing students to perspectives different from their own, in interesting students in the material, in encouraging them to relate it to their own lives, and, to a certain extent, in encouraging class participation. The teaching strategy appeared well adapted to the dynamics of a small classroom.

Using the teaching strategy in a large class unquestionably presented problems. For some students the assignment seemed too vague, the environment was too cold and impersonal to permit the sharing of personal stories, and cooperative effort felt too far removed from traditional lecture hall activities. In hindsight I can see that focusing the assignment on in-class learning experiences and spending time in small group discussions, perhaps with some students trained to facilitate these discussions, would have prevented some of the frustrations. Additional time spent introducing the assignment to collect essays would also help students feel comfortable in requesting them from their friends.

As a teacher I realize the importance of going beyond the simple sharing of experiences in the classroom to involve students in critical thinking about ideas. In one way in this teaching strategy the students' opportunity to analyze their essays is halted by the presentation of Perry's theoretical perspective. However, the end of the exercise, which describes how Belenky and her colleagues built on and expanded Perry's ideas after studying a new population of subjects (women) and returns to the essays to see if they appear well explained by the theory or if they suggest new hypotheses to be tested appears to get the point across that psychology is a dynamic field of inquiry. In my future work I would like to look at the ways in which critical thinking is enhanced by participation in exercises such as this (see Halonen, 1986).

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AN UNDERGRADUATE B.S. IN ENVIRONMENTAL PSYCHOLOGY:
DEVELOPMENT, EXPERIENCE, & EVALUATION

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ABSTRACT

    The development and evaluation of an undergraduate B.S. pro-
gram in Environmental Psychology are discussed. Program goals
included providing students with specialized courses, research
and practica in this relatively new field and preparing graduates
for advanced study or immediate employment in technical posi-
tions. The program has met objectives, other than the expecta-
tion that baccalaureate graduates could find relevant employment.
The courses are viable and students have produced several
publications and paper presentations. They have also met success
in pursuing graduate study. Program size has been limited by
rigorous requirements, scarce resources, and the extra demands on
involved faculty.

INTRODUCTION

    While its roots are much older, it is during the last twenty
years that Environmental Psychology has emerged as a recognized
field of study. This status is reflected in a burgeoning re-
search literature (G. Stokols and Altman (eds.) Handbook of En-
vironmental Psychology, 1987), the existence of specialized pro-
fessional organizations (e.g., APA Divison 34-Population and En-
vironmental Psychology; Environmental Design Research Associa-
tion), topical journals and books (e.g., Environment and Behav-
ior) and perhaps, most visibly, the existence of graduate and
undergraduate courses and programs.

    The first graduate program in Environmental Psychology was
established at CUNY (1968) and a variety of programs now exist at
institutions scattered across this country and in other
countries (Gifford, 1987). Undergraduate courses appeared more
recently but have now attained a frequency and distribution com-
parable to other specialized courses in psychology (e.g., Com-
parative Psychology). However, few coordinated programs of study
exist, even today, at the undergraduate level.

    The Psychology Department at the State University College at
Buffalo first offered an undergraduate course in Environmental
Psychology in 1972 and received SUNY approval for a B.S. program
that included Environmental Psychology as one of three speciali-
zation options in 1974.

    The program, as stated in the original proposal, had five
objectives:

    1.   To make available to students with a variety of educa-
         tional and professional goals an introduction to the
         systematic study of Environmental Psychology within the
         context of specialized courses.

2. To arouse student interest in the study of Environmental Psychology and to foster a more complete recognition of the interrelationships between human behavior and environmental problems.

3. To help students, through specialized courses, practi x, and related courses in other disciplines, to develop an interdisciplinary perspective on environmental issues.

4. To provide psychology majors and others meeting the program requirements with credentials that will aid them in pursuing advanced study in psychology, Environmental Psychology, and related areas.

5. To provide students completing the program who seek employment at the baccalaureate level with training and experience that would make them attractive candidates for subprofessional or technician-level jobs in government and industry.

There is an experience base of well over a decade now (15 years for some of the courses) with this program and it seemed worthwhile and appropriate to evaluate the program and to share these data with other interested in the teaching of Environmental Psychology. Evaluation research has mushroomed with the recognition that it can provide important input in planning and policy decision processes. Zube (1980) correctly noted that evaluation research "provides valuable feedback, systematic learning from past experience and guidance for the future."

Materials and Methods:

An archival research approach was applied to a variety of data generated in the development and during the existence of the B.S. program in Environmental Psychology at the State University College at Buffalo. This approach included both an informal review of protocols and the application of descriptive statistics to appropriate data (e.g. class rosters, grade reports, student course evaluation data, etc.).

Results:

Three required and sequential specialized courses (nine credits) formed the core of this program as it was initially approved. They were imbedded in a 39-credit major designed to ensure the student a solid overall background in psychology. Major requirements included Introductory Psychology, a three-course methods sequence (Statistics, Experimental I, Experimental II) and a senior seminar. Program participants also completed two electives in psychology and a nine-credit block of supporting courses in other departments (e.g. Resource use and planning, en-

vironmental pollution, environmental design), by advisement. The
three course sequence in Environmental Psychology included
introductory (PSY 370) and advanced (PSY 470) content courses and
an independent study/project/practicum (PSY 499, 495 or 488).
The program strongly stressed advisement and mentorship, and
students were admitted to the program only if they: had
completed nine hours of Psychology (with a "B" average), the
introductory course in Environmental Psychology, and were
sponsored by the faculty program coordinator. However, the
introductory and advanced content courses (PSY 370 and 470) were
open to all students who met their prerequisites.

The first course in Environmental Psychology (Psy 370)
requires only Introductory Psychology (PSY 101) as a
prerequisite. It presents a survey of the field in a fairly
traditional context of lecture, discussion, and limited
demonstrations. Students complete three hourly examinations made
up of short answer essays and a long essay. Students are
required to submit an extensive term paper that may be a review
and evaluation of a relevant empirical issue in Environmental
Psychology; a summary and critique of some significant
theoretical issue; or an APA style research proposal.

The second course (PSY 470, Advanced Environmental Psy-
chology II) is substantially more innovative. It is run in
seminar style. Students read one or more advanced books (and/or
a set of relevant articles) in more limited areas of Environmen-
tal Psychology. There is extensive discussion of assigned read-
ing and weekly quizzes or critiques. Students are also required
to prepare a presentation on a topic relevant to the course.
They submit an extended outline and two or three assigned read-
ings for the class a week before their presentation. The actual
presentation is 30 to 50 minutes in length. Students are evalu-
ated on both the outline and actual presentation. Lastly,
students are required to submit an APA style research proposal on
an empirical topic relevant to the focus of the course. There is
at least one field trip outside class time. Extensive consulta-
tion between the student and faculty member on all phases of the
course is a built in requirement.

The student internship and/or independent research require-
ment is done on an individual basis for students admitted to the
B.S. program. These experiences are student-initiated and are
jointly designed and agreed to by the student and faculty mentor.
Consultation and approval is also secured from the host setting
in the case of internships and field research. Some of the pro-
jects grow out of the PSY 470 course. They have proved to be
outstanding learning experiences that are uniformly viewed as the
highlight of the program by student participants.

There have been only relatively minor changes in require-
ments. The original program had required that the senior
seminar be in an environmental psychology area but this

proved to present a potential barrier to timely graduation and was dropped.

This program has remained small, having one or two enrolled students across levels in any given year. The two required content courses, PSY 370 and PSY 470, have generated sufficient enrollment to remain viable (average enrollment PSY 370=18, range= 13-37; PSY 470=4, range=2-9). PSY 370 is offered each semester while 470 is offered every two to three semesters. Thirteen students have been officially enrolled in the program and eight have graduated with the B.S. in Environmental Psychology. Six of these have pursued, or are pursuing, graduate study in psychology, four of whom received masters or doctoral degrees. None of the program enrollees found employment directly relevant to the program after receiving the baccalaureate.

Student evaluations of the individual courses and the program have been more positive than the normative data for other courses. Students have worked on research or practicum placements in a wide variety of settings (e.g. county planning office, group homes for retarded persons, health department). Both majors and nonmajors in the advanced courses have generated research projects that have produced five student authored or coauthored publications in refereed journals, two technical reports for sponsoring agencies, five papers at regional or national professional conferences, four presentations at outside undergraduate conferences and six presentations at our yearly College Sigma Xi conferences.

Conclusions:

The program has been a modest success. The two content courses are viable and attract students from other disciplines that are relevant to environmental issues (e.g. Design, Urban and Regional Planning, Sociology, Biology), as well as psychology majors and general students. The practica have placed selected students in community/government agencies and in relevant research projects. However, program size has been limited by scarce resources and the ability of the single faculty coordinator responsible for the program and courses to balance the extra service requirements against other departmental, college and professional demands. The most disappointing feature has been our ex'erience that the program has not provided graduates with any greater marketability than that associated with our B.A. in Psychology. On the other hand, the success of graduates in pursuing graduate study, including admission to doctoral programs in Environmental Psychology, is gratifying. Persons considering the implementation of similar specialized undergraduate degree programs should recognize the rewards and costs associated with these programs.

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A Classroom Demonstration of the Stigmatizing Influence

of Mental Illness Labels

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Running head: LABELING DEMONSTRATION

Abstract

A demonstation of the stimatizing influence of mental illness labels is discussed. Students in an abnormal psychology class were asked to read a response for the first card of the Thematic Apperception Test and were asked tc write a paragraph describing the personality of test taker. In the instructions which introduced the TAT response, however, half the students were told that it was obtained from a physician and half were told that it was obtained from a mental patient. As predicted, students who were in the "mental patient" condition used far more negative adjectives and far fewer positive adjectives in their descriptions of the test taker. The method of conducting the exercise is discussed along with suggestions for adapting it to demonstrate important concepts in abnormal and social psychology.

Most abnormal and introductory psychology textbooks discuss
the diagnosis of psychological disorders and introduce students
to The Diagnostic and Statistical Manual of Mental Disorders
(DSM-III-R), the official diagnostic manual of the American
Psychiatric Association (1987). When discussing advantages and
disadvantages of diagnostic practices, many authors alert
students to the fact that diagnostic labels can produce social
stimatization.

To illustrate the potentially harmful influence of labels,
authors often cite Rosenhan's (1973) classic study in which eight
"normal" adults secretly gained admission to twelve mental
hospitals by stating that they were hearing voices. All but one
of the pseudopatients were admitted with a diagnosis of
schizophrenia. Although the pseudopatients dropped all pretenses
of abnormality after admission, none of the pseudopatients were
ever detected by the staff, despite the fact that they stayed an
average of 19 days. Rosenhan (1973) hypothesized that the
pseudopatients were not detected because the staff interpreted
their "normal" behavior as symptomatic of their disorders, and he
provided striking examples of how strongly the label of
schizophrenia distorted staff interpretations of normal behavior.
For example, one of the pseudopatients described himself as
having a relatively normal childhood and a good relationship with
his wife and children. However, his case summary stated that he
had a "long history of considerable ambivalence in close

relationships," and it indicated that his "efforts to control emotionality with his wife and children are punctuated by angry outbursts" (p.253). Clearly, the staff member who wrote the summary construed information about the pseudopatient in a highly negative fashion that was consistent with the pseudopatient's presumed pathology.

Rosenhan's (1973) study, and other frequently cited investigations of labeling effects (e.g., Langer & Abelson, 1974; Temerlin, 1968) serve a very useful function in sensitizing students to the fact that mental illness labels can produce harmful social consequences. However, that point can be made even more vividly and meaningfully by demonstrating to students that their own perceptions and interpretations may be influenced by diagnostic labels. The classroom demonstration described below was designed to accomplish that goal.

Method

Subjects: Participants in this demonstration were 10 males and 10 females enrolled in an abnormal psychology course at Lycoming College. Students were encouraged to participate in the activity but were given permission to decline or terminate participation if they objected for any reason.

Apparatus: The apparatus for this experiment consisted of the first card of the Thematic Apperception Test (TAT) and two forms

of a one-page handout. The instructions on both forms briefly introduced students to the Thematic Apperception Test by stating that is was a psychological test that consisted of a series of pictures. Both introductions further indicated that people who take the test are asked to make up a story about each picture and that their stories are subsequently analyzed to help assess their psychological make-up. The instructions then referred to a TAT response that was typed below and asked students to read the response and write a paragraph describing the test taker. However, the first form stated that the response was obtained from a prominent male physician, while the second stated that the response came from a mental patient. To illustrate, the "physician" instructions read as follows:

> The following story was obtained from a <u>prominent male physician</u>. I would like you to act as if you were a psychologist who was trying to understand the personality of this <u>physician</u>. Read the story carefully, looking for clues that reflect on his psychological makeup, then write a paragraph describing him. Feel free to speculate as much as you like about such things as how he is currently feeling or how he generally expresses his feelings, how he gets along with others, how his family background might have influenced the development of his personality, or any other features that might describe what he is like in real life. Write the paragraph on the back of this sheet of paper.

The second form of the instructions was identical except for the fact that the words "mental patient" were substituted in each of the underlined places in the above paragraph.

The TAT response was identical for both sets of

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instructions. The story was actually written by the author for the purpose of the demonstration rather than being a true response from either a physician or mental patient. The story, which is about the boy and violin shown in the first card of the TAT, was written as follows:

This boy is Peter. This is his violin. His mother told him he has to finish practicing before he can go out and play, but he just can't stand to do it anymore. He's really tired and discouraged because he can't figure out how to play the music his violin teacher assigned him. So he just sits there and stares off into space. He thinks about breaking the bow, and telling his mom it was an accident so he won't have to practice anymore, but he knows she will be quite upset if she figures out he broke it on purpose. So he sits there and daydreams. He thinks about how he could be playing with Mike, the boy down the street who has a new bike he'd like to get a chance to ride. He thinks he could play with Sally if Mike wasn't home, but he's still mad at her because she laughed at him when he didn't know the answer to the teacher's question in class this afternoon. He wishes she would do something stupid so he could make fun of her too. After awhile he looks at his violin and daydreams about becoming a famous violinist who would impress thousands of people, including Sally. He reluctantly picks up the violin and starts to play it again.

A deliberate attempt was made to design the story so that some of the behaviors portrayed could be interpreted in a positive or negative fashion depending on the interpreter's bias. For example, the child's daydreaming about wanting to play with the boy down the street with the new bike could be positively viewed as an indication that the test taker was friendly and sought companionship with others, or it could suggest that the test taker has a tendency to use others for personal gain.

Procedures: This demonstration was conducted early in the
semester at the beginning of the course segment that introduced
diagnostic and assessment procedures. At the start of a class
period, students were told that during the next couple class
periods the instructor would be discussing procedures
psychologists use to evaluate and diagnose individuals who are
thought to have psychological problems. The instructor then
stated that the first assessment tool they would discuss would be
the Thematic Apperception Test, and he noted that he wanted to
introduce that test with an exercise that would give them some
personal familiarity with its use. He then handed out copies of
the two forms discussed above, having previously arranged the
forms in a pile so that the distribution of "mental patient" and
"physician" versions was random. Students were instructed not to
put their names on the instruction sheet. After reading the
instructions, students were shown the first card of the TAT. They
were then asked to read the response to the card and to write a
paragraph describing the person who allegedly provided the
response.

When all students had completed the assignment, their
responses were collected and randomly redistributed so that each
student now had another classmate's response. They were then
instructed to read the response and to circle all the positive
adjectives (e.g., happy, self-confident, strong, energetic) and
phrases (e.g., gets along well with others, strives to do well)

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that were used to describe the test taker. In addition, students were asked to circle all the negative adjectives or phrases that were used to describe the test taker. Students were then told to add the total number of positive responses and the total number of negative responses they had circled and to put each tally at the top of the page.

Students were then informed about the true purpose of the demonstration including the hypothesis that those who had been given "mental patient" forms would use more negative adjectives and phrases to describe the test taker and fewer positive adjectives and phrases. The total number of positive and negative responses for both the "mental patient" and "physician" conditions were then listed on the blackboard, and the mean number of positive and negative statements obtained for each group was computed. In addition, several students from each of the two conditions were asked to read their responses aloud so that students could get a more qualitative appreciation for the differences between the two conditions.

To minimize any tendency for people who may have been strongly influenced by the label to feel bad about themselves, it was stressed that most humans are influenced by labels to some degree because we have a tendency to process information in a way that confirms our preconceptions and expectations. It was further stated that although it was important to be aware of this process, being susceptible to it in no way suggests that we do

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not care about others.

Results

As predicted, students used significantly _fewer positive_ adjectives and phrases in their descriptions of the mental patient (M = .90) than in their descriptions of the physician (M = 3.00), $t(18)$ = 3.59, p <.01. Similarly, significantly _more negative_ adjectives and phrases were used in the paragraphs describing the mental patient (M = 5.60) than in paragraphs describing the physician (M = 2.4), $t(18)$ = 3.02, p <.01.

Although the differences in the mean numbers of positive and negative descriptors obtained across the two conditions provided significant statistical evidence of a labeling effect, the influence of labeling was also demonstrated by asked several students to read the paragraphs aloud. For example, one of the "mental patient" descriptions portrayed the test taker as follows:

> He seems to be very insecure. His parents may have pushed him to always be the best that they thought he could be, which made him resent them in the long run because he wasn't able to do what he really wanted to do. He's probably very inward and shy, but he dreams about being famous and having people like him. He doesn't seem to like authority figures, such as parents, teachers, and the law because they hold him back from doing what would make him happy. I would say that he doesn't have many friends, if any.

In contrast, one of the descriptions obtained for the "p. ominent male physician" was written in the following fashion:

The person who made up this story seems to be well-
educated and also seems to be able to relate to people
very well. This person sounds like he came from an
average family that brought him up well. This person
also seems to convey feelings that he might have been
kept from doing some things he wanted to do. He also
sounds like he is goal oriented. Although he may be
feeling a little bit discouraged right now, he has hope
for the future. His ability to get along with others is
suggested by the statement that he has friends to play
with.

Student interest and involvement was clearly highest when
the paragraph descriptions were read. Thus, an intructor could
easily save time, without losing impact, by omitting the
tabulation of positive and negative adjectives and merely having
students read a few paragraphs from each condition.

Discussion

The results strongly supported the hypothesis that students
would analyze a TAT response in a far more negative fashion if
they thought the response came from a mental patient than if they
thought the response came from a physician. Consistent with the
findings of the Rosenhan (1973) investigation, the results of the
current demonstration suggest that people process information
about others very differently when those people have been labeled
as mental patients. That is an important fact for students to
realize as they often seem eager to label others once they begin
to learn the labels and symptoms for various psychiatric
conditions. They must understand that although diagnostic labels
serve many useful purposes, they can produce negative social

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consequences as well. To further develop that point, the findings
of several investigations that have examined the consequences of
labeling adults (e.g., Langer & Abelson, 1974; Temerlin, 1968;
Rosenhan, 1973) and children (e.g., Critchley, 1979; Yates,
Klein, & Haven, 1978) can be presented and discussed.

This demonstration is used as part of a lecture on the
advantages and disadvantages of diagnostic practices in the
mental health field. It is therefore best suited for introducing
the diagnostic process in abnormal or introductory psychology
classes.   However, the demonstration could be readily adapted to
illustrate several other psychological issues with little or no
modification. For example, the demonstration could be used as is
to introduce the TAT and to stress the problem of obtaining
reliabl_ and valid interpretations with that assessment
instrument.   The high variability in the responses students gave
within each of the experimental conditions is a good example of
the difficulty in obtaining inter-rater reliability with
projective tests.

This demonstration could also be used as a social
psychological demonstration of the "confi:mation bias" that has
been described by writers in the social cognition area (Cantor &
Mischel, 1979; Nisbett & Ross, 1980). That is, researchers (e.g.,
Darley & Gross, 1983; Synder & Swann, 1978) have shown that once
a person knows that another individual belongs to a particular
group (be it race, gender, religion, a socioecomonic class,
sexual orientation, or a type of mental disorder), he or she will

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process any additional information about that individual in a fashion that confirms the stereotypes he or she holds about members of that group. That process was clearly evident in the current exercise as many students processed the information in the TAT response in a fashion that was consistent with their preconceptions of mental patients or physicians. A similar effect would probably be obtained by substituting other social categories (e.g., heterosexual, homosexual) in place of the "mental patient" and "physician" labels used 'n the current study.

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Classifying the Character of Esther Greenwood in Sylvia Plath's
The Bell Jar:
A Technique for Teaching Psychological Disorders

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Glancing through current journals one can't help but notice the proliferation of courses that are interdisciplinary in nature. This trend is quite understandable as these courses facilitate a major teaching objective: students' attainment of critical thinking skills. In essence, an interdisciplinary course pushes students to think more broadly about each discipline by illuminating the relationships between disciplines. Psychology and literature are often paired as interdisciplinary offerings, since psychology is the study of behavior, and literature is behavior portrayed in art.

The most common approach to such a course, according to a survey reported in Teaching of Psychology, is the application of psychoanalytic theory to characters in literary texts (Grant, 1987). Although this application yields many insights into human behavior, it doesn't teach students how psychologists collect, analyze and critically evaluate data. It provides only for a unidirectional approach, that is, the application of psychological theory to literary characters. The corresponding assignments developed in such courses often do not require the students to make reciprocal connections between the content of both courses. We designed a team taught interdisciplinary course in Psychology and Composition at Salem State College that utilizes activities that are reciprocal in nature. That is, these activities ask the students to employ psychological instruments, such as assessment instruments and diagnostic criteria, to characters in literary texts. These assignments integrate psychological assessment techniques with literary analysis to increase the students understanding of both domains.

To implement this concept of reciprocal learning, we developed several exercises that improved students' ability to think and write more

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clearly. In applying psychological instruments to characters in literary texts, students simulate the process used by psychologists either to examine the validity of particular psychological theories or to diagnose psychological disorders.

One such exercise requires the students to apply certain content in abnormal psychology to a disturbed character in a literary text. Using selected categories from the third version of the Diagnostic and Statistical Manual (DSMIII), students are asked to examine the behavior of the main character, Esther Greenwood, in Sylvia Plath's The Bell Jar. In preparation for this activity, the students first read the novel. After introducing the concept of adaptive and maladaptive behaviors, we give the students are given a brief overview of the history of abnormal psychology. They then hear a lecture describing the major diagnostic categories. In light of Esther's portrayal, which includes depression and loss of contact with reality, the lecture ends with a specific focus on Schizophrenia, Affective Disorders and Adjustment Disorders. The students assignment is to then diagnose Esther into one of the following categories: Delirium, Schizophrenia, Major Depressive Episode, Paranoid Personality Disorder, and Narcissistic Personality Disorder. Please refer to the checklist which includes a description of the diagnostic criteria for each category.

To further develop the students' understanding of the differences between the pathologies, they are asked to find support for their diagnosis using the checklist and pointing to specific passages in the text which describe behaviors that comprise a particular syndrome. Through the classroom discussion that follows, and in a subsequent written assignment, the students discover the difficulty of assessing what constitutes abnormal behavior, and of diagnosing human behaviors into a single category. Finally,

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this activity serves as a bridge between understanding psychopathology and its treatment.

Once the checklist has been completed the students are required to read the text's presentation of the treatment of abnormal behavior, choose one therapeutic technique, prescribe a treatment for Esther, and describe the way they would intervene in the course of her disturbance.

Because we believe this is a very challenging assignment for students at an introductory level., we suggest it be given toward the end of the semester. Previously, we had designed activities in which the students answered a series of questions that were adapted from highly structured interviews about characters in literary texts (Zeren & Lusignan, 1987; Schultz & Zeren, 1988). In these earlier activities, then, the students were responsible for finding specific information in response to specific questions. In The Bell Jar activity, however, students were asked to complete a more complex task. That is, they had to simultaneously comprehend criteria for a variety of diagnostic categories. The process of categorizing Esther Greenwood's behavior had to be made not only on the basis of what she did, but also on what she did not do. Furthermore, the students could not even begin to diagnose her without grappling with the difficult and unfamiliar terminology. This activity, then, was especially challenging because it involved the management of evidence as well as how to make a convincing argument and an accurate diagnosis. This might account for our impression of less voluntary student participation during this activity as compared to the other activities in which psychological instruments were applied to characters in plays and novels.

We were at first dismayed that the students were so much less talkative during this activity than they had been in the others. In fact, we

were discouraged enough to wonder whether we should use it again. But later, some students recounted that the DSMIII handout had been the topic of discussion in the dormitory the night before class. Our students as well as students not even in the class had been fascinated by these categories and the descriptions of behavior described there. Certainly the handout had stimulated discussion among themselves that was not reflective of their level of participation in class that day. And later in the day, a few students stopped by during office hours and commented that they had enjoyed the class, and had learned a great deal.

After reflecting on this delayed, but positive response, it was again driven home to us that there is not necessarily a relationship between the amount of student discussion an activity generates and how valuable the students perceive the activity to be. The students seemed to be stimulated and challenged by this activity, despite their initial reticence.

The activity concluded with a writing assignment. Students were asked to write a paper on the following topic:

"Using the DSMIII handout, diagnose Esther Greenwood's illness. Your paper should argue your view, citing Esther's symptoms as they appear in specific passages in the text. Conclude by prescribing treatment, based on information from your text. Minimum length is four (4) typed pages."

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We were very pleased with the outcomes of this assignment. The papers were carefully conceived, constructed, and executed. Certainly, students wrote convincing and well-argued papers. It is clear that the step-by-step process we described above was a very effective form of prewriting and drafting a paper. The papers further demonstrated the students good understanding of these types of abnormal behaviors. This may demonstrate a well known pedagogical principle: that integrating and applying information makes for a deeper understanding of what has been learned. This principle is particularly relevant in interdisciplinary offerings and appears to be best achieved when the assignments reflect a truly reciprocal integration of both domains.

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Testing, Measurement, and Evaluation
in the College Classroom

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Most of us spend the majority of our faculty development
time attempting to keep up with readings and research in our own
fields of specialty. This leaves us with very little time to
"learn" to be better teachers and even more rarely do we find
time to investigate the methodology for better classroom measure-
ment and evaluation. This presentation will only provide a sum-
mary of several of the issues many of us may need to become more
familiar with and integrate into our own teaching. Weaknesses in
our own measurement and evaluation techniques appear to be a major
area of complaint by college students. Major complaints regard-
ing examinations include: ambiguous wording, too specific, too
long, too few cr too many, dissatisfaction with item format, and
lack of adequate and timely feedback. In this limited period of
time I cannot discuss the many possible alternative methods of
classroom evaluation, therefore the focus of this presentation
will be on the use of examinations for evaluation purposes. Before
I continue, I would like to present a synopsis of the results of
two surveys of students and faculties ideas regarding student
evaluation.

Students (139) and faculty (29) at Marist College were asked several questions regarding classroom measurement and evaluation. Samples of the two surveys are included along with the summaries of results in the set of attached handouts.

Students preferred take home over open-book exams and least preferred close-book exams. Instructor preferred the reverse order (close book, open book, then take-home). As students matured (Freshmen to Seniors) their preference for take-home exams became more pronounced. It may be interesting for faculty to consider this mismatch in an exam-type preference.

Students indicated the following exam-item type preferences: (1) multiple-choice, (2) short-answer, and (3) matching items. Faculty preferences were: (1) short answer, (2) essay, and (3) multiple-choice. Once again, this mismatch in preference may be worth considering.

Both students and faculty reported that the final and midterm should have the major impacts on the student's course grade. Students select term papers as being the third most important factor for course grades. Faculty selected class participation and group projects as the third and fourth most important factors. Additional data collection comparing whether student and faculty preferences actually match course grading practices would be interesting and worth considering.

A large number of students (52%) reported cheating on exams and 44% reported cheating on assignments. Females

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reported cheating significantly less often than males. Sadly,
students rarely reported feeling ashamed or guilty about
cheating. Students (92%) often reported being aware of other
student's cheating. They reported being angry about the other
student's cheating behavior and that it was not fair that other
students might be getting better grades by cheating. Older
students reported being more aware of other student's cheating.
Faculty (72%) often reported being aware of cheating on tests.
and (80%) on assignments. Higher ranked faculty (e.g. Full
Professors) reported being more aware of cheating. Students
(72%) felt faculty were generally unaware of cheating. Only
10% of the faculty stated they never experienced a cheating
incident. Students (21%) felt that there were times that
faculty were aware of cheating, but did nothing about it.
Faculty reported always responding to any incident of cheating.
It seems very unfortunate that students may be left with the
belief that some faculty ignore cheating in their classrooms.
Perhaps we should consider taking active steps to eliminate
this perception. Students (60%) report that instructors have
confronted students publicly. about cheating. Interestingly,
all faculty reported never confronting students publicly.
Students specifically reported seeing instructors take away
exams during the testing period. I wonder if instructors do
not consider taking away tests or asking students to change
seats a public confrontation, but students do consider this a
public confrontation. Students (24%) were aware of instructor

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privately confronting students, although faculty (76%) state
they confront privately much more frequently. Students (19%)
much less frequently than faculty (52%) reported use of making
a general announcement to the class cautioning against cheating.
Are faculty making such an announcement and students are not
listening, or do faculty fail to remember to make such an
announcement or perhaps they do not make the statement clear
and direct. Women faculty reported being less likely than
men faculty to make a general announcement against cheating.

Students reported that faculty generally clearly state
grading criterion, but were less satisfied with the level of
feedback about grading that faculty provided. Although many
faculty (45%) did not feel they could judge how well other
faculty perform in these aspects of measurement and evaluation,
those faculty who were willing to rate other faculty's perfor-
mance, felt that faculty make grading criterion clear and
further agreed with students that the greatest weakness was
in the area of providing adequate feedback to students. Female
faculty reported feeling this was a greater weakness than did
male faculty. Non-tenured faculty were more likely to also
report that faculty greatest area of weakness is providing
adequate feedback to students. Perhaps this is an area we
as faculty could consider working on improving.

For the majority of students, grades remain the single most important aspect of the course and often the grades are largely determined by test scores. One of the most valuable questions we can answer may be, "Is rote memory what you want to test?" Time will not permit a thorough summary of all the issues regarding testing students, therefore I have prepared a summary of guidelines for writing of objectives, pitfalls of classroom testing, pros and cons of the various item formats, and rules of thumb for test length and organization (see handouts).

Before you begin the process of developing an examination, formulate course objective, use these objectives to guide your teaching, and write test items which match your course objectives (see handout 1). Construct a test blueprint or grid to make sure you adequately test your objectives. Students' comments regarding failure of teachers to test their objectives include, "If the teacher is going to test for facts then he should give us facts," and "More of the course should be like the tests, making us apply what we learn." Also, rule-of-thumb suggests that tests that require understanding, rather than just memory of detailed facts, result in better retention of course material.

One major barrier to students maximizing their performance seems to be student test anxiety. Consider giving a test very early in the term which does not have a major impact on their final grade. Such a policy may help to reduce test anxiety, perhaps even the temptation to cheat, and gives the student a

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feel for what your examinations are like. This also may allow them to prepare more cffectively for future examinations. I hope you agree that better preparation for exams seems to be an admirable goal for both students and instructors to strive toward. The question of whether or not examinations should be cumulative is difficult to answer. Cumulative exams generally require broader integration and analysis; but may lower validity because of limited item sampling. Non-cumulative exams may limit the amount of active integration of material, but leaves room for requiring more detail and perhaps more thorough unit coverage. The decision for or against cumulative exams needs to be answered by examining your course objectives and the purpose of your test.

The selection of item format for exams is also a complex issue. I have included summaries of several different item types which include a discussion of the pros and cons of each type (see handouts). In general, those tests that take less time to prepare (e.g., essay exams) generally take longer to grade and those which take more time to prepare well (e.g., multiple-choice) often take less time to grade. You should not choose item format merely on the basis of class size (multiple-choice for large size classes, short-answer for medium size classes, essay for small size classes) or the availability or non-availability of item banks. Select the type of item which most effectively tests the skill you want to evaluate. Most professors argue it is almost always necessary to have some

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essays on each college-level exam, since this format is more likely to require analysis, integration, and/or application. Students need continued practice on organizational and creative thinking skills. This also gives them the opportunity to check their ideas against the standards of an expert, someone more experienced in the particular field of study (i.e., you). Essays can also be used to give you a more accurate idea about what students are learning (rather than merely what they failed to learn-i.e. what item they got wrong on a multiple-choice test) and whether the students are able to recognize what is and is not important.

A common problem, that many students experience, is a poor test-taking strategy. Consider spending time teaching students how to take tests If it's worth taking class time to give a test we should want it done in the best fashion possible. Students can be taught how to increase the odds of getting a multiple-choice item correct. Some students know how to do this better than others, is this what you were intending to test and grade? For example, tell them how to make a logical guess even on the items they do not confidently know the answer to, by eliminating any alternative they know is wrong and then guess. Also, tell them not to get hung-up (and up-tight) on the problems they do not know, but to go on to those items on which they do feel confident that they know the correct answer. Thirdly, encourage them to look over their answers if they have time. They may catch clerical errors,

items they missed answering, or items on which they think they
should change their answers. Finally, consider letting
students write comments along with multiple-choice answers,
letting them explain their answers and the difficulty they
may have had deciding between two alternative answers. This
not only serves to reduce test anxiety, but can also act as
important feedback for the instructor. For essay items,
suggest to your students that they outline their answers first.
This helps prevent them from omitting important aspects of
their answer. Secondly, some students freeze or draw-a-blank,
on certain items. Suggest that they try a stream-of-consciousness
approach for a few minutes, where they write down anything that
might be relevant. This process generally provides them with
something relevant to write about. Finally, students should
be encouraged to try to respond to every question. This gives
them an opportunity to earn a few points rather than no points
at all. Students indicate that it is helpful to have the
instructor discuss the process they go through when they develop
and grade an examination. Try to avoid making your exams
"tricky," some students may enjoy solving the puzzle, but most
will be left feeling angry and frustrated. Encourage your
students to write neatly, and use good grammar and careful
spelling. Students can spell, punctuate, and write more clearly
if they need to, but often don't bother if it isn't expected.

If you expect your students to do quality work on exami-
nations then provide them clean, well-organized, and professional

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looking examinations that demonstrate your effort and care in its preparation. Make sure you have a few extra copies so you don't run short because of a miscount, poorly printed copies, or copies missing a page. Try to minimize interruptions during the exam, test taking instructions should be included in the exam booklet and any other instructions or announcements should be written on the blackboard. Consider handing out the test as soon as the students enter the room. This procedure can eliminate waves of panic, prevent time to copy notes on desk tops, or the development of other forms of cheating. It is my belief, which appears to be supported by statements from students, that they would rather not cheat, but because of grade pressure they do. Often times students further claim, "Other students were cheating and the teacher didn't seem to care, so I cheated also." There are many ways that students cheat and I will share a few with you. (Ignorance is not bliss!) Students may cheat by: (1) not showing up on scheduled exam day and getting information about the exam content from a classmate; (2) taking the exam early or late, knowing the instructor never proctors very closely for just one student; (3) looking onto someone else's exam; (4) writing answers on the desk top either the day of the exam or even as much as several days before; (5) writing on a soda cup, tissues, the back of notebook, a backpack, a bagel, a cigarette pack, use bottom of a shoe, cuff of pants, etc.; (6) having a code system with another student such as nods, taps, or coughs;

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(7) leaving the room to go to the bathroom where the student
has left notes or books waiting for them, (8) changing
answers after you returned exams, claiming you made an error
in grading; and (9) having cheat sheets or notes tucked in a
book or perhaps, laid out on the floor, under the desk,
or on a chair beside them, etc. Telling students you know
about these methods and others, and reminding them you were
once a desperate student too, seems to deter their temptation
to cheat. Announce ahead of time, any policy you or the school
may have regarding cheating, students logically will then
assume that you will not knowingly tolerate cheating. Try
to remember how you felt when you were a student when someone
was cheating in your class and the instructor appeared to know,
yet did nothing about it. We should not allow cheating in our
classes, it is not fair to those students who work hard. If
you are concerned about wandering eyes try saying to the student,
"I'd like you to move to a seat where you will be less crowded."
If they indicate they are not crowded simply add, "I prefer
you move." I've never had a student argue with this request.
When you must actively intervene or challenge a student about
cheating, it will be uncomfortable for both of you, but it may
also lead to you helping the student with an even greater
underlying problem (e.g. poor study skills overall, emotional
problems, etc.). Keep in mind, cheating on your exam definitely
lowers the validity of your exam and undermines your purpose
for testing. Let me now suggest situations that are likely to
affect whether or not cheating occurs. When there are only

one or two exam grades which comprise the majority of the
course grade, there is often more cheating. During "unreasonable"
exams which include high demands for knowledge of "trivial"
detail, there usually is more cheating. Students are less
likely to cheat if you know your students by name and if
you are "actively" proctoring during the exam by strolling
through the aisles while watching for questions. Crowded
classrooms tend to encourage cheating. If you cannot get a
classroom large enough for alternate seating, provide alternate
forms of the exam where not only the questions (stems) are
scrambled, but also the alternatives (foils) are scrambled
within the question. Do not announce that you have alternative
forms and try not to make the forms appear obviously different.
There also seems to be more cheating when you are too casual
about exam security, such as leaving copies of exams lying
around in your office or in the secretary's office. Remember,
janitors, student aides, and graduate assistants have all been
bribed for copies of exams or even for the contents of your
wastebasket.

It appears to be unnecessary to convert exam scores to
standard scores as long as the set of examinations to be averaged
or totaled have similar means and standard deviations. Students
have great difficulty interpreting standard scores, as do many
instructors. It may be necessary though to differentially
weight longer or more important exams. It also appears unneces-
sary to provide correction for guessing formulas. This procedure

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does not appear to significantly increase exam validity.
Promptly return examinations with correct answers indicated
on the students' exams. Examinations should be a learning
process, not merely a mode for determining a course grade.
Avoid allowing students to argue the correctness or incorrect-
ness of a graded item in a public debate. If you publically
concede that one student's reasoning is appropriate and deserves
grade adjustment, it is likely anyone who got that item wrong
will claim they reasoned in that fashion and deserve a grade
adjustment also (the "jumping-on-the-band-wagon" phenomenon).
Consider reading examples of good answers to the class (anony-
mously) or allowing students to break into small groups to
discuss the test. For those students who come to you dissatis-
fied with their grade, avoid changing the grade (you'll
quickly become known as an 'easy mark'), but do encourage
conversation on "what we can do to help you (the student) do
better next time." Another method is to have a student write
a paragraph about their grade complaint. Then let them know
you will make an appointment with them to discuss their concern
after you have had time to read their paragraph. Indicate
that you will consider changing their grade, but forewarn them
that your careful analysis could result in a grade change in
a positive or negative direction. This also gives the student
a feeling of power or control over their life, not merely left
to the mercy of the instructor. Provide the class with the
distribution of grades on the exam and consider providing means

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and standard deviations for them also. Keep students updated throughout the course regarding how they are doing, this avoids surprises at the end of the course and perhaps prevents arguments about final grades.

The issues I have raised, suggestions I have made, and guidelines I have provided were rarely original or new. They were areas where students and faculty alike,seemed to feel we as teachers often do not consider as often as perhaps we should. I hope I have raised some important issues and made some valuable suggestions. Hopefully the appropriate changes will occur in each of our own personal areas of weakness regarding classroom measurement and evaluation.

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Instructor Survey

1. Check (✓) _each_ of the following terms that describe you.

   a. ____Male   ____Female

   b. ____Full Professor

      ____Associate Professor - Tenured

      ____Associate Professor - Non-Tenured

      ____Assistant Professor - Tenured

      ____Assistant Professor - Non-Tenured

      ____Instructor   ____Adjunct Professor (Instructor)

2. For the classes you usually teach, what portion of the student's
   course grade do you think should be based on the following possible
   course requirements. Rate _each_ item by using the numbers 1-4,
   where:
   1=Major portion, 2=Moderate portion, 3=Small portion, 4=No portion

   ____short quiz   ____short paper   ____attendance at
                                                     out-of-class events
   ____midterm exam   ____term paper
                                                 ____group project/
   ____final exam   ____class attendance   group paper or
                                                      presentation

   ____other _____
                       (specify)

3. For the classes you usually teach, what type of test-taking
   condition do you think is preferable? Rate _each_ item using the
   numbers 1-3, where:
   1=Most preferred, 2=Next m   preferred, 3=Third choice

   ____closed-book   ____opened-book   ____take-home

4. For the classes you usually teach, indicate how well you like each of the following types of questions which you might utilize on an examination. Rate each type of item using the numbers, 1-4, where:

1=Like very much, 2=Like, 3=Dislike, 4=Dislike very much

_____essay (one page or more)   _____true/false

_____short-answer (a few words   _____multiple-choice
     or sentences)
                                        _____matching
_____fill-in-the-blank   .
     (one or two words)

_____other_____
                    (specify)   .

5. How often have you observed or discovered a student cheating on an exam at Marist? (Check (✓) one)

_____never   _____rarely   _____occasionally   _____often

6. How often have you observed or discovered a student cheating on other course requirements at Marist? (Check (✓) one)

_____never   _____rarely   _____occasionally   _____often

7. What actions have you taken when you have observed or discovered a student cheating? (Check (✓) all that apply.)

_____never aware of a student cheating   _____confronted the student
                                                in private
_____did nothing
                                           _____confronted the student
_____made a general announcement   in front of the class
     to the class cautioning against
     cheating   _____other_____
                                                        (specify)

8. Indicate how well you think most instructors at Marist do with regard to the following aspects of giving course grades. Rate each item using the number 1-4, where:

1=Very well, 2=Well, 3=Poor, 4=Very poor

_____make grading criteria clear   _____provide adequate feedback on
                                             grading of course work
_____have clearly written exams
                                        _____base course grade on several
_____make clear the material on   different types of activities
     which a test will be based   (tests, quizzes, and papers,
                                             etc.)

                                        _____No basis for judgment

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Student Survey of Course Evaluation

1. Check (✓) each of the following terms which describes you.

   a. ____Male   ____Female

   b. ____Freshman   ____Sophomore   ____Junior   ____Senior

   ____Other_____
   (specify)

   c. ____full-time   ____part-time

2. Your overall grade-point average here at Marist is closest to a: (Check only one)

   ___4.0   ___3.5   ___3.0   ___2.5   ___2.0   ___1.5   ___1.0

3. What portion of your course grade do you think should be based on the following possible course requirements. Rate each item by using the numbers 1-4, where:

   1=Major portion   2=Moderate portion   3=Small portion
   4=No portion

   ____short quiz   ____class attendance   ____attendance at
                                                        out-of-class events
   ____midterm exam   ____short paper
                                                    ____group project/
   ____final exam   ____term paper   group paper or
                                                        presentation
   ____other_____
            (specify)

4. What type of test-taking condition do you prefer? Rate each item using the numbers 1-3, where:

   1=Most preferred   2=Next most preferred   3=Third choice

   ____closed-book   ____opened-book   ____take-home

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5. Indicate how well you like each of the following types of questions which you might find on exams. Rate <u>each</u> type of item using the numbers 1-4, where:
   1=Like very much 2=Like 3=Dislike 4=Dislike very much

   ____essay (one page or more)

   ____short answer (a few words   ____true/false
       or sentences)
                                          ____multiple-choice
   ____fill-in-the-blank (one or
       two words)   ____matching

   ____other_____
                  (specify)

6. How often have you cheated on an <u>exam</u> at Marist? (Check one)

   ____never   ____rarely   ____occasionally   ____often

   If you cheated, how did you cheat?_____

   _____

   If you cheated, how did you feel about cheating?_____

   _____

7. How often have you cheated on <u>other</u> course requirements at Marist? (For example, copied another student's written work or passage from a book without citing the source, etc.) (Check (✓) one)

   ____never   ____rarely   ____occasionally   ____often

   If you cheated, what type of assignment was it and how did you cheat?

   _____

   If you cheated, how did you feel about your cheating?

   _____

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8. How often have you seen (or personally been aware of) another student cheat on an <u>exam</u> or <u>assignment</u> at Marist? (Check (✓) one)

____never ____rarely ____occasionally ____often

If you have seen another student cheat, how was he/she cheating?

_____

If you have seen another student cheat, what were your feelings about the cheating?

_____

9. What actions have you seen instructors take when a student is cheating? (Check (✓) <u>all</u> that apply.)

____instructor appeared unaware

____instructor appeared aware and appeared to do nothing

____instructor confronted the student in front of the class

____instructor confronted the student in private

____instructor made a general announcement to the class cautioning against cheating

____other_____
(specify)

10. Indicate how well you think most instructors do in the following aspects of giving course grades. Rate <u>each</u> item using the numbers 1-4, where:
1=Very well   2=Well   3=Poor   4=Very poor

____ make grading criteria clear   ____provide adequate feedback on grading of course work

____have clearly written exams

____make clear what material will be tested   ____base course grade on several different types of activities (tests, quizzes and papers, etc.)

15)

SUMMARY OF STUDENTS' SURVEYS (self-report)

Sex	N	%
Males	25	18
Females	114	82

Class	N	%
Fresh	15	11
Soph	42	30
Junior	46	33
Senior	36	26
Total	139	100

GPA	N	%
4.0	2	1
3.5	21	15
3.0	0	0
2.5	49	35
2.0	49	35
1.5	14	10
1.0	1	1
No Response	3	2

Type of Exam preferred

Type	$\overline{X}$	Rank
close-book	2.12	3
open-book	2.00	2
take home	1.88	1

Exam item-type preferred

Type	$\overline{X}$	Rank
multiple-choice	1.77	1
other	1.88	2
short answer	1.97	3
matching	1.98	4
essay	2.15	5
true/false	2.43	6
fill-in	2.62	7

Measurement type/Grade emphasis

Type	$\overline{X}$	Rank
final	1.62	1
mid-term	1.74	2
term paper	1.87	3
other	2.32	4
group project	2.41	5
short paper	2.42	6
class attendance	2.52	7
quiz	2.68	8
out-of-class activity	3.35	9

*other: class participation (8)
effort (5)
oral examination (2)
self-initiated activity

Self-cheating/Exams

Category	N	%
1. never	65	47
2. rarely	53	38
3. occasionally	18	13
4. often	1	1
No response	2	1

$\overline{X}$ = 1.67

Self-cheating/assignments

Category	N	%
1. never	76	55
2. rarely	43	31
3. occasionally	17	12
4. often	1	1
No response	2	1

$\overline{X}$ = 1.58

Others – cheating

Category	N	%
1. never	11	8
2. rarely	24	17
3. occasionally	66	48
4. often	37	27
No response	1	1

$\overline{X}$ = 2.94

Instructors' reactions to cheating

Reaction	N	%
unaware	100	72
aware/did nothing	29	21
confronted in class	83	60
confronted privately	33	24
general announcement	26	19
other	17	12

*other: took paper away (12)
kept eye on student (2)

How do instructors do?

Category	$\overline{X}$
grading criterion clear	1.66
clear written exams	2.02
material clear	2.26
adequate feedback	2.32
different activities	2.09

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Self reported methods of cheating on exams   N

looking on another student's test	33
using cheat sheet(s)	19
mutual sharing of info	6
copies of exams	5

Reactions to own cheating on test

doesn't bother me	18
guilty	9
desperate	5
scared	3
others cheat, so I cheat	3

Self reported methods of cheating on assignments

copied others work	31
copied material without quoting	15
ask others for ideas	3

Reactions to own cheating on assignments

everyone does it	18
scared I might get caught	4
felt a little guilty	4

How others cheat

looking on other's papers	80
cheat sheet(s)	64
talking to each other during exam	11
copy of exams	6
passing answers around	5
signals	2

How student felt about others cheating

not fair/I studied	31
their business, not mine	13
they are cheating themselves	12
indifferent	8
can't condemn I do it; the pressure	6
misc. (8 different comments)	8

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COURSE OBJECTIVES

Guidelines for Objectives:
1. Is the objective relevant?
2. Is the objective feasible?
3. Is the list of objectives complete?

Descriptions of the Major Categories in the Cognitive Domain	Behavioral Terms
1. Knowledge: The remembering of	Defines, describes, identifies, labels, lists, matches, names, outlines, reproduces, selects, states.
Word leads for questions: what happened when, where is, when did; identify, match, define	
2. Comprehension: The ability to grasp the meaning of material. This may be shown by translating material, by interpreting material, and by estimating future trends.	Converts, defends, distinguishes, estimates, explains, extends, generalizes, gives examples, infers, paraphrases, predicts, rewrites, summarizes
Word leads for questions: Restate in your own words, describe, which of the following is an example, translating from the graph.	
3. Application: The ability to use learned material in new and concrete situations.	Changes, computes. demonstrates, discovers, manipulates, modifies, operates, predicts, prepares, produces, relates, shows, solves, uses.
Word leads for questions: Explain how, explain why, what would account for.	
4. Analysis: The ability to break down material in its component parts so that its organizational structure may be understood.	Breaks down, diagrams, differentiates, discriminates, distinguishes, identifies, illustrates, infers, outlines, points out, relates, selects, separates, subdivides.
Word leads for questions: Compare, contrast, what are the significant features of, distinguish between.	
5. Synthesis: The ability to put parts together to form a new whole.	Categorizes, combines, compiles, composes, creates, devises, designs, explains, generates, modifies, organizes, plans, rearranges, reconstructs, relates, reorganizes, revises, rewrites, summarizes, tells, writes
Word lead for question · construct, devise a test for, write, imagine what would happen if, how would you produce.	
6. Evaluation: The ability to judge the value of material for a given purpose.	Appraises, compares, concludes, contrasts, criticizes, describes, discriminates, explains, justifies, interprets, relates, summarizes, supports.
Word lead for questions: does this meet the criteria for, is this a good example of.	

Major Categories and examples of Behavioral Terms in the Cognitive Domain of the Taxonomy of Educational Objectives (Bloom, 1956).

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PREPARING CLASSROOM TESTS

I.   Deficiencies Often Found in Teacher Made Tests
   1. Ambiguous questions
   2. Excessive wording
   3. Lack of appropriate emphasis
   4. Use of inappropriate item formats

II. Checklist for Planning Stage in Preparing Classroom Tests
   1. What is the purpose of the test?
   2. What skills, knowledge, attitudes, and so on, do I want to measure?
   3. Have I clearly defined my instructional objectives in terms of student behavior?
   4. Have I prepared a table of specifications?
   5. Do the test items match the objectives?
   6. What kind of test (item format) do ⊥ want to use? Why?
   7. How long should the test be?
   8. How difficult should the test be?
   9. What should be the discrimination level of my test items?
   10. How will I arrange the various item formats?
   11. How will I arrange the items within each item format?
   12. What do I need to do to prepare students for taking the test?
   13. How are the students to record their answers?
   14. How is the essay portion to be graded? Global or analytical?
   15. How are the test scores to be tabulated?
   16. Have I avoided excess verbiage, race and sex biases, ambiguous phrases or word, and hints which would inappropriately aid in answering the question.

Test Length - The length of the test will vary according to its purpose, the kinds of items used, the reliability desired and ability of the students tested.

   1. For the four or five-response multiple choice items the student should be able to respond to the item in about 75 seconds.

   2. For a short essay response (about a half page), students can answer about six questions in a one hour testing period.

   3. For the longer essay (two to three pages), about three questions in one hour.

   4. For the short-answer matching, or T/F item, roughly it will take the student about 50 sec. to respond to each item.

   5. Test length 9- 120 min. maximum is usually recommended.

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Essay Items

I. Two Major Types of Essay Responses

A. Extended -response
Student chooses points to discuss and an organizational format. Often flexibility and freedom of choice may cause unreliability in scoring.
Permits student to:
1. Call upon factual knowledge
2. Evaluate his/her factual knowledge
3. Organize his/her ideas
4. Present his/her ideas in a logical, coherent fashion
5. Tests the level of synthesis and evaluation of writing skills

B. Restricted-response
Student is more limited in form and scope. (Student is told specifically the context that his/her answer is to take.) By aiming students to the desired responses, we minimize reliability problems, and make scoring easier. (Greatest value for measuring learning outcomes of comprehension, application and analysis levels.)

II. Advantages and Limitations of Essays

A. Advantages
1. Easier to prepare compared to multiple choice tests.
2. Only test item means we have to assess one's ability to compose an answer and present it in effective prose.
3. It tests one's ability to supply rather than select correct answers.
4. Preferred by students over multiple choice.
5. They possess ecological validity or present a realistic situation.

B. Limitations:
1. They have limited content sampling (especially in extended-response)
2 Low reader reliability
   a. More questions, reduce this problem
   b. This problem can be minimized by careful question construction and setting up specific grading (scoring) procedures.

III. Writing a Good Essay

1. Use adequate time and thought when preparing essay questions.
2. A well-constructed essay question should establish a framework within which the students operate.
   a. Use descriptive words; 'describe, define, etc.'
   b. Delimit the area covered by the question
   c. Aim the student to the desired response
   d. Indicate the value of the question and the amount of time one should spend on answering it.
3. Decide in advance the factors that will be considered in evaluating an essay question.

4. Do not provide optional questions on essay tests, They increase unreliability (difficult to make up equally difficult questions).
5. Consider using a large number of short answer ($\frac{1}{2}$ page) questions, instead of a few essay questions, to increase reliability.
6. Don't start essay questions by saying 'list, who, what, whether' because they tend to elicit responses and possible regurgitation of factual information.
7. Adapt the length of response and complexity of the answer to the maturity level of the class.
8. Use the novel type questions whenever possible, (apply same principle or thought process to a new situation).
9. Prepare a scoring Key.
   a. State what points students should discuss
   b. In advance, make out an acceptable or model answer for each question.

V. Two Types of Scoring
   A. Global Scoring-Recommended when the teacher has a large number of paper to grade. The ideal answer is not sub-divided in to specific points and component parts; it simply serves as a standard. All factors are taken into account when forming a judgment about the adequacy of the response. Select papers to serve as anchor points for various grade subdivisions.
   B. Analytical methods-'point-score' method, recommended when the teacher has only a few papers. The ideal or model answer is broken down into specific points. The students score is based upon the number of points contained in the answer.
      1. Usually used for the restricted-response essay questions.
      2. Student's score is based on the number of required points contained in his answer.
      3. The points must be assigned specific values.
      4. The values placed on each question must balance with the:
         a. Time needed and given to respond
         b. Complexity level of the question
         c. Emphasis placed on this question during the instructional phase
      5. Student is required to mention certain specifics, ex. dates, people, places, etc., in order to receive points.
      6. High reliability and ease in grading since specific parts of a response are required for credit.
      7. The effectiveness of a teacher's process of preparing questions can be evaluated by observing the students' responses, ex. the poor wording of a question can be discovered if many students answer a question with misinterpretation, or similar mistakes are being made.

Suggestions for Grading

1. Check score key against actual responses by trying out your model answers on a few randomly chosen tests to make sure the model is appropriate.

2. Randomly shuffle tests before grading to prevent teacher bias due to the comparison in grading of previous tests. Grade anonymously.

3. Grade only one test question at a time (Ex., do all the questions numbered one, first) to reduce the 'halo' effect.

4. Try to score all responses to a question without interruption to maintain validity due to outside manipulation.

5. The mechanics of expression should be judged separately from what the student writes. -Teacher should specify the areas of concentration for grading criteria before the test is administered (Ex., grammar).

6. When possible, have two independent readings of the test and use the average of the two as a final score. (This will increase the reliability of the score.)

7. Provide comments and correct errors. (Before, during and after tests should all be learning experiences for the students. Also provides direction and reinforcements.)

8. Set realistic standards. (Being too hard or easy on students both cause a decrease in motivation.)

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WRITING THE OBJECTIVE TEST ITEM

I. Considerations for Objective Test Items
   1. Test for important facts and knowledge.
   2. Tailor the questions to fit the examinees' ability levels as well as the purpose of the test.
   3. Write items as clearly as possible.
      a. Avoid qualitative language; use quantitative language whenever possible.
      b. Use good grammar and sentence structure.
      c. If the purpose of a test is to measure understanding of a principle rather than computational skill, use simple numbers and have the answer come out as a whole number.
      d. Come to the point as quickly, clearly and simply as possible.
   4. Avoid using interrelated items.
   5. Avoid lifting statements verbatim from the text.
   6. There should be only one correct (or best) answer.
   7. Avoid negative questions.
   8. Do not give the answer away. Some irrelevant clues are:
      a. Having information in the stem of one item provide the answer to another item.
      b. Lack of parallelism between stem and responses in the multiple-choice item.
      c. The length of the correct response (in multiple choice item).
      d. The position and pattern of the correct answer.
      e. Grammatical clues such as an "a" or "an" preceding a blank in the short answer or at the end of the stem in the multiple choice.
      f. Using words like "always", "never", "sometimes", "all", and "normally" in true-false items.
   9. Get an independent review of your test items. Preferably, by another teacher of the same subject.

II. Short Answer Items
   A. Three common types:
      1. The question variety-the item is presented as a direct question.
      2. Completion variety-an incomplete statement is used.
      3. Association variety- Ex., Write in the name of the state in which the city is located.

   B. Suggestions for writing short answer items
      1. For computational problems, the teacher should specify the degree of precision and the units of expression expected in the answer.
      2. Include important words only.
      3. Avoid excessive blanks in a single item.
      4. Have the blanks occur near the end of the sentence.
      5. Generally speaking, it is advantageous to use the direct question rather than the incomplete statement.
      6. To test for knowledge of definitions and/or the comprehension of technical terms, use a direct question in which the term is given and the definition is asked for.
      7. Don't skimp on the answer space provided.

2-

III. Matching Exercise
   A. Description
      The matching exercise consists of two columns-one column
      consists of questions or problems to be answered(premises);
      the other column contains the answers (responses). The
      examinee is presented with two lists and is required to
      make some sort of association between each premise and
      response.
   B. Major Advantages of the Matching Exercise Are:
      1. They require little reading time. Many questions
         can be asked in a limited amount of time.
      2. Matching exercises can be scored by machine.
      3. Easy to score by hand because there is only one
         correct answer to each question.
   C. Major Deficiencies Associated Matching Exercises Are:
      1. If sufficient care is not taken in their preparation,
         the matching lists may encourage serial memorization
         rather than association.
      2. It is sometimes difficult to get clusters of questions
         that are sufficiently alike that a common set of
         responses can be used.

IV. Suggestions for Constructing the Matching Exercise
   1. When possible, have the response list consist of short
      phrases, single words, or numbers.
   2. Each matching exercise should consist of homogeneous items.
      A single matching exercise should consist of items that
      deal with only a single concept, classification, or area.
   3. Keep each list relatively short. Long lists require the
      student to spend too much time reading and looking for
      the answer. The number of responses in each matching
      exercise should range from 5 to 12.
   4. Avoid having the answers in some systematic fashion.
   5. Avoid giving extraneous irrelevant clues.
   6. Avoid having an equal number of premises and responses.
      A good rule of thumb is to have two or three more responses
      than premises. .
   7. Explain clearly the basis on which the match is to be made.
      The student must be given explicit directions so he will
      know what to do and how he is to do it.
   8. Maintain grammatical consistency.
   9. Every response in one column should be a plausible answer
      to every premise in the other column.

V. Writing True-False Items
   A. Definition:
      The true-false (also called alternate-response)item is a
      two-response multiple-choice item in which only one of the
      propositions (answers) is presented and the student judges
      the truth or falsity of the statement.
   B. Common Variations of the True-False Item Are:
      1. Yes-no-often used to measure attitudes, values, beliefs,
         and interests
      2. Right-wrong
      3. Cluster Variety. In the cluster variety (sometimes called
         the multiple true-false format), there is one incomplete
         stem with several suggested answers.

4. <u>Correction variety.</u> In the correction variety, the subject is required to make every false statement true by crossing out the incorrect portion and replacing it with the correct word or phrase.

C. <u>The Major Advantages of True-False Items:</u>
1. Can cover a larger amount of subject matter in a given testing period than any other objective item. (A student can answer about three T-F items for every two multiple-choice items.)
2. Generally provide high reliability per unit of testing time.
3. Can be scored quickly, reliably and objectively by almost anyone.
4. Are particularly suitable for testing for beliefs in popular misconceptions and superstitions.
5. Are adaptable to most content areas.
6. The true-false item needs only one good response to a stem.
7. Can, if carefully constructed, measure the higher mental processes of understanding, application, and interpretation.
8. Are as valid as multiple choice items.

D. <u>The Major Disadvantages of the True-False Item:</u>
1. Students' scores on short true-false tests may be unduly influenced by good or poor luck in guessing.
2. True-false items are more susceptible to ambiguity and misinterpretation than any other selection-type objective item, therefore resulting in low reliability. In fact, true-false tests tend to have the lowest reliability.
3. They lend themselves most easily to cheating.
4. They tend to be less discriminating, item for item, than multiple-choice tests.
5. They are susceptible to an acquiescence response set; that is, subjects tend to develop a pattern of responding in an automatic form without giving thought to the item.
6. There are many instances when statements are not unequivocally true or false; rather, there are degrees of correctness.
7. Specific determiners are more prevalent in true-false items than in any other objective item format.
8. Students don't like them.

E. <u>A Checklist for Writing True-False Items:</u>
1. Is each item expressed in clear, simple language?
2. Did you avoid lifting statements verbatim from the text?
3. Have negative statements been avoided where possible?
4. Have specific determiners such as all, may, sometimes been avoided?
5. Have double barreled items (part true, part false) been avoided?
6. Have trick questions been removed?
7. In the correction-type true-false, is the word(s) to be corrected clearly indicated?
8. Is each item clearly true or false?

9. Are there approximately the same number of true
   and false items?
10. Have the items been edited?
11. Have the items been independently reviewed?

THE MULTIPLE CHOICE ITEM
A. How to Write Multiple Choice Items
   1. Essence of problem must be in the stem
   2. Avoid repetition of words in options
   3. Avoid superfluous wording
   4. When incomplete statement format is used options should
      come at the end of the statement.
   5. Arrange alternatives as simple as possible.
   6. Avoid highly technical distractors
   7. Avoid using true-false distractors
   8. All responses should be plausible and homogeneous
   9. Avoid "all of the above"
   10. Consider providing "I don't know" option
   11. Use three to five options
   12. Use "none of the above" sparingly if at all
   13. Avoid overlapping options
   14. Avoid negative statements.
   15. Keep wording to a minimum, especially answer alternatives.
   16. Wrong alternatives should not contain words unfamiliar
       to students.
   17. Avoid the words always and never in the stem.
   18. Keep answer alternatives the same length.
   19. Keep alternatives grammatically correct.

B. Advantages of Multiple Choice
   1. Can be scored quickly
   2. Versatility
   3. Relatively efficient
   4. Degree of difficulty of test can be controlled by
      changing the degree of homogeneity of the responses.
   5. Provide valuable diagnostic information. Measure
      specific knowledge and precise discrimination.
   6. Provide greater test reliability per item than true
      or false.
   7. Easier to respond to and better liked by students.
   8. Consider having students submit items, about 10% will be usable.

C. Disadvantages of Multiple Choice
   1. Difficult to construct
   2. Requires the most time for student response out
      of all selection-type objective items.
   3. Tendency for teachers to write multiple choice
      items that demand only factual recall.
   4. Test-wise students do better on multiple choice than
      do non test-wise students.
   5. Takes a long time to make up multiple choice questions.
   6. It's a reading recall (if one has a reading disability
      he can lose out).
   7. Avoid using test bank items passively, analyze them
      look for ambiguity do not assume they are accurately keyed.

L. Dunlap

Take-home, Open-Book, Closed-Book Exams

Closed-   1) good for testing mastery of certain factual
               information
           2) develops memorization skills
           3) might not study as much if it was open-book
           4) more anxiety: blank out/stomach aches

Open-   1) life reality: look up information; life doesn't
               expect you to memorize everything.
           2) good to hand person facts and ask questions to
               develop comprehension, analysis, synthesis,
               application.
           3) develops practical realistic skimming techniques
           4) rewards students who keep up with reading and
               know where to find facts.
           5) might make student confident enough to study
               for and try throughout the exam than give up
               because a closed book and factual memorization
               would be too overwhelming.
           6) open book tests tend to have questions requiring
               higher level reasoning, such as emphasizing and
               applying rather than merely memorizing.
           7) may be difficult to devise appropriate open book
               questions for some type of courses.
           8) any kind of item format can be open-book.
           9) there may be less of a tendency to cheat.
          10) occassionally students futilely spend a great deal
               of time searching for answers and end up not being
               able to complete the test.

Take-home

       If ability to express knowledge in a written fashion is
a course objective then consider a take-home exam. Take-homes
eliminate time pressures and gives students an opportunity to
practice good writing habits. Some students do not know how
much is enough time to spend on a take-home. There can be a
great amount of grading to do. It is also difficult to be
certain the students take-home is entirely their own work.

Assembling, Reproducing, Administering, Scoring and Analyzing Classroom Achievement Tests

I. Arranging the test items - group all items of the same format together.

II. Organization -
1. Separate items on each item format.
2. Arrange sections-progress from easy to more difficult. (e.g. T/F, matching, short answer, multiple choice, interpretive questioning, essay questions.)
3. Space items so they aren't crowded - easy to read.
4. Keep all items and stems on the same page.
5. Diagrams above the stem.
6. Avoid patterns with correct answers.

III. Directions -
1. Clear, concise, should tell what, how, and where to respond.
2. Include - time allocated to sections, value of the item, if the student should guess or not.
3. Each item format should have a specific set of directions.
4. Tell how the test will be scored.

IV. Item Analysis - the process of examining the students response to each test item to judge the quality of the item.
1. Arrange test papers from highest to lowest score.
2. Make two groups.
3. For each item, count how many answer the item correctly.
4. Make chart-upper/lower.
5. Compute percentage -

$$\text{difficulty} = \frac{R}{T} \times 100 \qquad \begin{array}{l} R = \text{\# that answered correctly} \\ T = \text{total \# of pupils tested} \end{array}$$

range: .00-1.00

Ideal Difficulty
Completion and Short Answer	.50
Multiple Choice	.75
True/False	.85

6. Compute item discrimination index -

$$\text{discrimination} = \frac{R_u - R_l}{\frac{1}{2} T} \qquad \begin{array}{l} R_u = \text{\# answered correctly} \\ \quad \text{in upper group} \\ R_l = \text{\# answered correctly} \\ \quad \text{in lower group} \end{array}$$

range from 1.00 to -1.00 $\frac{1}{2}T$ = one-half total subjects used

Ideal discrimination: generally the higher the better.
Discard item with negative values.

7. Do discrimination for the distractors (this should be a neg. #).

8. Ask students themselves about the test items. Students can and often do make good suggestions for improvement of items.

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Enhancing the Pre-Exam Review

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Abstract

Review sessions for exams are a common component of many courses.
It is surprising, therefore, that hardly any advice is given on
how to run review sessions. The 12 most recent Instructor's
Manuals on my desk contain an endless stream of information on
constructing syllabi, organizing courses, and identifying and
securing media materials. Included also are numerous suggestior `
for discussion topics, dithering devices, classroom
demonstrations, mini-lectures, suggested exam questions, and even
how to project ones' voice. None of these manuals provides even
a single suggestion on how to run pre-exam review sessions.
Typical pre-exam review sessions appear to involve trying to
review major points that may be on the exam. The problem, of
course, is that if one does too good a job, students may wonder
why they bothered coming to all the other classes, and colleagues
may charge the instructor with coaching for the exam. An
alternative is for the professor to ask students questions so
that the students can get an idea of what is important and how
much they know. This, at least, requires active involvement by
students, but in my experience it generates as much enthusiasm as
a root canal, and doesn't address the problem of coaching.
Another method of pre-exam review consists of asking students to
generate questions. My experience with this approach is that the
vast majority of questions asked by students deal with the format

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of the exam or what will and won't be asked on the exam.
Occasionally, a student will request an explanation to some
concept, but more often than not, the concept is so complex or
esoteric, it wouldn't be on the exam. While it pleases the
professor to be able to respond to such curiosity or confusion,
it hardly serves as a useful review for the majority of students.
More often than not, such sessions last significantly less than
the full period. Indeed, before developing the approach that
will be described in the talk, the most enthusiasm I've seen
during a review session is when I've dismissed class early. The
technique to be described in my talk promotes active learning.
It generates tremendous enthusiasm--students often ask to extend
the class period. It provides positive incentives for studying
material well before the exam (distributed practice). It
provides feedback, while there is still time to utilize it, as to
how well one knows the material in comparison to others in the
class. It encourages students to learn to discrim ate between
important and trivial material, and provides feedback on how well
they have done this. It stimulates students to ask questions
about important material they don't understand. The technique
requires less preparation time for the professor than most review
methods. The method will be described in detail along with data
demonstrating its effectiveness.

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Enhancing The Pre-Exam Review

Several years ago, I was reviewing an Instructor's Manual that came with a new I/O book. It described a technique, I believe it was called the Phillips 66 technique, that fancy schmancy business types developed for use at trendy management training seminars to help participants learn each others' names. I'm a strong believer in learning students' names, so I was excited about this idea. In fact, I practically ran into my first class of the year to tell my new students how we would accomplish this normally arduous task in effortless, fun-filled fashion.

I explained the technique with breathless anticipation. The last words had barely left my trembling lips, when a sweet young thing in the back row, with a look of total disdain that I shall not soon forget, whined with a piercing, sarcastic voice that belied her fragile countenance: "Oh, not that! We had to do t-h-a-t in Girl Scout camp!!"

I mention this, because at a conference like this, with so many bright, creative people, there is no way that the same thing wouldn't happen, no matter what the idea, or how unique it seems to someone like me who is from a small town in central Pennsylvania who rarely hears what's happening on the other side of Bald Eagle Mountain. I do talk a lot, though, and that could also be the undoing of my fantasy of coming here and describing a

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wonderful, creative idea that no one ever thought of before.
What I'm saying is, you aren't the first. I've been giving
speeches on the technique I'm about to describe since 1984. I've
told a lot of people. Maybe some of them have told others. I
know other people are using the method. The last person I heard
about doesn't even know me. He probably got the idea all by
himself. I wouldn't be surprised, because I'm not terribly
creative. I usually think of things about a decade after they
have gone out of fashion. I mean, I just bought my first pet
rock last week.

So what am I doing here? Well, in that class I mentioned, I
went ahead and used the Phillips 66 technique--sometimes called
the Girl Scout technique--anyway. And I still use it, because it
works. And I'm going to tell you about my technique for running
pre-exam review sessions for the same reason. It works. More
importantly, it works after four years and some 60 replications.
That excites me, because almost everything I try in the classroom
works for me the first time, when I'm all enthusiastic, and
almost nothing I try works for me the 10th or 15th time, much
less the 60th, when the students and I have grown blase about the
idea. But this does. So, I'm not claiming to have come here as
a prophet, to reveal unknown insights to you. I'm here as an
evangelist, to try to persuade you to give something you've
probably thought or heard about yourself a try. These days
evangelists seem to be having all the fun anyway.

What I want to discuss is the pre-exam review. I don't know that all faculty and students consider it important, but many do, probably the majority. And I suspect we all know the alternative approaches: assigning or recommending work books that accompany the text; providing handouts identifying important terms and concepts; devoting a class or special evening session to reviewing important material; having student assistants available at specified times and location; and so on.

How well do these approaches work? I don't know. If you know of any studies directed at this question, I hope you will tell me. Someone must have studied this, but I can't find it. And I've tried. First, I tried on my own. I looked through all my Instructor's Manuals, past issues of <u>Teaching of Psychology</u>, <u>Periodically</u>, and every other teaching journal or book I keep as dust collectors in my study. I couldn't find any data.

Next, I assigned some student assistants to the task. The most notable was a freshman member of our Lycoming College Scholars Program. Their brains don't stink. They're supposed to be r-e-a-l smart. This one thought he was. He practically oozed confidence when I gave him the assignment.

Although I was disappointed in a professional sense, I can't say I didn't enjoy just a little bit the change from arrogance to despair that gradually came over him as he admitted at meeting after meeting that he hadn't found any data comparing the relative efficacy of different pre-exam review techniques.

In fact, he could barely find anything on pre-exam reviewing period. He finally gave me a list of all the places it wasn't: 104 Library of Congress Numbers of relevant sounding books that don't contain suggestions or data about pre-exam reviews.

Well, I decided to call on a pro. We have a librarian that does literature reviews for faculty research projects. She uses computers, so you know she's good. She checked enough sources to gag A Library of Congress groupie: 26,749 sources on Reviewing, 50,577 on testing, and so on. She did find one article that looks interesting: "The Role of Review in Mathematics Instruction." It's in Arithmetic Teacher. I'll have to get that. But the point I'm trying to make is that for something many of us just sort of take for granted we should do, running pre-exam review sessions of some kind, there is remarkably little advice on how to best do it, much less concrete data on effectiveness.

The absence of data rarely prevents me from guessing what the truth is. In fact, I tend to trust my guesses more than other people's data anyway, because I figure they're just trying to get tenure, or promoted, or hired, or some other self serving thing when they publish. I'm only after the truth, when I guess.

I would guess, that when it comes to pre-exam reviews, some profs can make some techniques work some of the time for some of the students, but more often than not, all of these techniques fall short of our hopes and expectations most of the time. I'll

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tell you why I believe this: First, students who most need to review are often the ones who are least likely to attend sessions or do workbook or exercise sheets. If you don't believe this, the next time a student comes to your office to discuss why she did so poorly on an exam, ask to see her workbook or study sheets. For fun once (don't tell me we don't know how to have fun in Williamsport.) I asked students to bring me their workbooks. This was in the week before the exam, and I actually sent them back to their dorm rooms to get them. I'm talking about an unannounced inspection, and not in one, but in four separate classes. Fewer than 20% had completed the exercises. The next time I do this, I'll correlate how much they've done and their grade up to that point to see if it is those who need it the most who do the least.

Second, let's assume students do use handouts of key terms and concepts to guide their study. My guess is that the fewer the key terms and concepts, the more likely it is they will use the handouts. However, limiting the content of review sheets raises an educational issue that some faculty find quite disturbing. Doesn't such coaching unduly limit the breadth of what students learn, orient them too much to what will be on a specific exam rather than to everything that is important, and deprive them of the opportunity to learn for themselves how to discriminate important material from the trivial? I think so. You may not. But let's acknowledge that there is an educational

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issue here.

Finally, let's consider review sessions. These seem to me to take one of three forms. In one, the faculty member chooses what is important and reviews it. To me, that has the same disadvantages as handouts, but worse, since the better students often find the review boring and repetitive, and the poorer students, if they attend, often find the abbreviated version little more helpful than the original, although by this time, their motivation sometimes runs higher. Also, if the content of the exam is going to be on`y what is covered `n a 1-2 hour review, what was the point of the previous 5 weeks of lecture? To help them understand the abbreviated version? I don't think so.

A second strategy is to ask students questions, the Socratic teaching method. This arouses all the excitement and enthusiasm of Paper Chase, the movie. Students' individual knowledge is placed on public display, and in my experience, the better students often protest the most because of the ridicule they receive from their less conscientious classmates for knowing the answers.

So we come to the third strategy used during class review sessions; letting students ask questions about material they don't understand. I'm not saying some of you can't pull this off. I can't. This is the strategy I used for 12 years at four colleges and universities. I never had a class ask enough

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questions to get us through the normal period, and although I never kept data, I suspect we were seldom there for over 15 minutes. And what questions do students ask? I kept track once. Out of 19 questions, two related to the format of the exam, three were on topics or material so specific or trivial that even the most sadistic professor would be unlikely to use it on an exam, or care if students knew it. I explained it though. Fourteen were of the type, "Do we have to know.....this or that?" I don't know about you, but sometimes I think I spend more of my time talking about what students don't have to know, than what they do. Incidentally, because of the way these sessions usually proceed, I find them very boring, although not as boring as the students seem to, because in my case, there is always the element of danger that a student may ask a question I can't answer and I will therefore make a total fool out of myself and lose their respect and get low student ratings and not get a raise and not be able to feed my family and, well, you get the picture.

Now, if we could have the trumpets on the right, the choir on the left followed by a drum roll in the back, I'll tell you about a technique which not only circumvents the aforementioned problems, but encourages the development of good study habits, and excites incredible interest among students. I can't claim that the idea struck me while sitting under an apple tree when an apple fell on my head or that I was sitting in a cave waiting out a thunderstorm, but like all great ideas, it occurred under the

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most unlikely of circumstances.

Just before midnight, I agreed to play one game of Trivial Pursuit the first game of Trivial Pursuit I had ever played. I'm not a game-playing person. Just before dawn, on the eve of the seventh game of Trivial Pursuit, the idea struck: If I can get so wrapped up in something like this, why not make a game out of test review? Could it be that students, who we all know hate education, could get wrapped up in a game like this?

I had an additional reason to believe they might. I had just completed a sabbatical with a community health organization in which we had gotten public school teachers to lose a total of 1 1/2 tons of excess blubber by staging a competition between teachers at different schools. It was unbelievable. Three local grocery stores went bankrupt. Not really. But competition runs deep in the American psyche. Also, I've devised other games for classes and read about other people doing the same. But this one seemed easier to do and more significant in its effect.

When I first started, I projected a board on a screen, had die, used questions devised by other sections of students, and did a whole bunch of things that I discovered were unnecessarily complicated and, well, trivial.

Here is what I do now: First, divide the class into groups of 5-7 students each. I try to form cohesive groups, in the technical sense of the word, to create a competitive in-group/out-group atmosphere. Some of what has worked for me has

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been divisions according to whether one is a first, middle, or last born child. I then mention a bit of the research or stereotypes regarding the differences between such people. I've made further divisions on the basis of gender: male, female and mixed groups. Class year, small town/large town, New Jerseyites vs. Pennsylvanians, departmental assistants (who everyone hates) vs. others, and so on, anything to create cohesiveness, with all that that implies.

Second, once group assignments are made, one week prior to the exam (e.g. Friday, if the exam is the following Friday), each student is given two 3x5 cards. By the following class period, they are to place on each card a question from the material to be covered on the exam, the answer, if they know it, the source (i.e. chapter and page if from the text, the lecture, or whatever), and their name. Each group is assigned a portion of the material. Hence, Group 1 may be assigned lecture and class material, Group 2 Chapters 1 & 2, Group 3 Chapter 3, and so on. Members of the group must draw their questions from that material or they may ask a question on any material that they don't understand. The cards are returned the next class period e.g. Monday, in one example.

I grade the cards on a previously announced 3-point scale:
3 - excellent question which could well be on the exam (To make the task easier for me, I assign a 3 to questions I recall having actually asked during my teaching career, i.e., I ask

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myself, "Have I asked that?" If the answer is "yes," I give it a 3.)

2 - good question, but due to its wording or importance, not quite as likely to be on the exam. (In this case, I ask myself, "Would I place this question on an exam?" If the answer is "yes," I give it a 2.)

1 - poorly worded question or one dealing with material of little importance. (I give a 1 to questions I would not place on an exam.)

The grading goes quite fast. Incidentally, I always tell the students that I cannot guarantee that a "1' question won't appear on the exam, and certainly a "3" may not. I could err. Apparently they are well aware of that, because I've never been called on this.

The class before the exam, review day, Wednesday, in our example:

--students divide into their groups, arranging their desks in small circles

--group names are placed on the board with room to record points

--topic areas (chapter numbers and topics corresponding to group assignments) are placed on the board

--cards are placed on a table up front arranged according to topic areas (i.e. group assignments)

--a stop watch is started and the first group has 60 seconds to select a category, hear, discuss, and answer a question

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--they may <u>not</u> select the category for which they devised
  questions

--they may <u>not</u> use notes or books to answer questions

--they <u>may</u> take notes, and virtually every student does - with
   enthusiasm!

--the point value of the question is announced immediately before
   or after the question is read

If the group answers incorrectly, or if time expires, each
subsequent group is given a chance to answer until all have
failed, or one is correct. Subsequent groups must be able to
answer immediately. This keeps all the groups on-task, not just
the group whose turn it is. The pace of discussion in these
classes is brisk, to say the least. When going around to other
groups, the group whose member asked the question is skipped. I
arrange the questions so that any that students couldn't answer
when devising them, i.e. those without answers on the card, are
on top, so that I can explain them. Remember, these questions
are graded for importance. This is not a game of out-smart the
prof., which I sometimes feel happens in some review sessions.
If it is on the card, students are saying, "I'm betting my points
that this is important, and I don't understand it." I tackle
those questions first. As usual, the group containing the person
who asked the question isn't permitted to answer, even though,
presumably, the person doesn't know the answer.

For each question correctly answered, one point is awarded

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and p   the board. The process continues until the period
_nds and every group has had the same number of opportunities to
select and answer questions. If questions from one category are
exhausted, another category has to be selected.

What happens to the points earned on questions and during
class? I've tried 3 options:

1) add them to the exam scores

2) add them to class participation scores

3) nothing

In terms of the number of points earned and my subjective sense
of enthusiasm, I have not detected a difference between these
alternatives, however I've only tried the third option once or
twice, and never repeatedly on the same class. I have an
intuitive feeling that applying the points to either the class or
test grade increases the motivation of some students, and that is
the way I prefer to run the game, with my top choice being to
apply the points to the class participation grade. On the other
hand, adding points to the exam grade isn't bad, since I usually
need to add points to my exams anyway. I think test questions in
Instructors' Manuals were written for a different generation of
students.

So much for procedure, let's turn to all the wonderful
things this technique does. First, it generates enthusiasm for a
session which is all too often viewed as dull and marginally   .
effective. I have some indirect data to support this claim.

Since 1984, I've given classes containing students familiar with
the game 58 opportunities to choose between playing Not So
Trivial Pursuit, having some other kind of review session, or not
reviewing at all. In all 58 cases, the class opted for Not So
Trivial Pursuit. In fact, I've never had a single student say he
or she would prefer one of the other alternatives.

But wait, I have even more convincing data. Last year, a
colleague of mine who would rather have a root canal than ask me
for advice on teaching came to my office and asked how to play
Not So Trivial Pursuit, because her class was clamoring for it.
Actually, gloating isn't that important to me...much. What is,
is the fact that I am easily bored by unresponsive classes, and
audiences, and I really look forward to these sessions. It is
one of the few classes in which I know I am going to experience
enthusiastic, active, discussion of material related to the
course. Normally such enthusiastic discussion is reserved for
describing how many guys or girls they...BEEP...over Spring
Break.

A second positive attribute of Not So Trivial Pursuit is
that it provides students with feedback about the relative
importance of different sections of the material without being so
directive that it might be seen as coaching for the exam. They
understand that what they are getting is a sample of what they
should know, just as an exam is a different sample of what they
should know, and that the review session does not attempt to be

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inclusive.

Third, the discussion promotes active learning and class interaction, not passive note taking, listening, or snoozing.

Fourth, it provides strong incentive for students to space their studying over at least a few days instead of cramming the night before the exam. They want to do well, and they want their group to do well, so they study for this, a full two days (usually) before the exam. Sometimes students complain they were in a lousy group and didn't get many points. I point out that it only takes one person, them, to have studied in order to get their fair share of points.

Fifth, those who do study, and most do, obtain concrete feedback as to how well they can answer questions of the kind that may appear on the exam. And they receive this feedback while they still have a day or two more to study.

A sixth advantage is that the process of trying to construct questions which they think will be on the exam is an activity that most How To Study books highly recommend. It is a good skill to practice, and this gives them some incentive and concrete reinforcement for doing so.

Relevant to this point are the perennial complaints by some students that there is too much material for the exam or they don't know what to study. An analysis of the ratings assigned their questions shows that they can accurately identify what materi _ is important. Complaints of this kind disappear after

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the first playing of the game. This deserves more emphasis. Students used to drive me absolutely bonkers with questions about what they _had_ to know, implying that they were incapable of differentiating important from unimportant material. These kinds of questions simply stopped, completely, when I started using this technique. I don't know whether they get the feedback they want from my scoring of their questions, or whether they just gain confidence in their own ability.

Another instance where the game has proven helpful in counseling students is in the all too familiar case where a student claims to have studied, as Carl Sagan might say, billions and billions and billions of hours, yet does very poorly on the exam. I haven't studied this systematically, but in every such case I've pursued, the student also did poorly writing Not So Trivial Pursuit questions, and worse on the essay portions of their exams than the objective portions. Specifically, their essays read like disjointed accumulations of facts without theme, purpose, or understanding. In other words, their work suggests rote memorization of everything rather than selection integration, yes, even comprehension of material. Even if I'm wrong on this point, it has given me something to talk to these students about. Before, I didn't know what to say to them. It's much better to find a way in which their studying might have been inefficient than to suggest they li about how much they study or they are just plain stupid.

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One thing I'm saying here is that this technique not only has numerous advantages for the student, but for the instructor as well. Check it out: It requires little preparation, time, or materials. It provides feedback regarding what material students do and don't understand, and how well they are able to discriminate important from trivial information. It offers an opportunity to clarify misunderstandings and to repeat important material. (By the way, I sneak in some of my own questions that I want to repeat before the exam.) It gives me the satisfaction of feeling that students are studying the way I think they should in terms of spacing their studying and developing the skill of recognizing what is important and what is not. Most important, it provides the satisfaction of seeing students actually getting involved in discussing course material they may have complained about having to learn only days before.

As with any technique, there are a few potential problems:

First, the class is likely to become quite boisterous and assertive, maybe even verbally aggressive. They may even challenge you on whether a group deserves a point or not. You can't be defensive, authoritarian, have a high need to be in total control of a class, or get intimidated if students take over a discussion. You must go with the flow, so to speak. A sense of humor is important. The students get into kind of a TV quiz show role playing mentality when they play this game. Sometimes, you have to use a sense of humor to break through the

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role playing and restore the perspective that there isn't a trip around the world at stake here. I believe most faculty can do that, but obviously some can't. So beware. If gung ho enthusiasm scares you, Psychological Pursuit isn't your game.

Second, sometimes better students complain that there w. a student in their group who didn't contribute, but got whatever points their group got. I point out to them that a) the difference in class points between the highest scoring group and the lowest scoring really isn't that great, and it is the difference in points that matters, not the absolute number, and b) a person who can't contribute anything to the game is probably going to get an F on the exam, and [that] these points will have no effect on their grade. I've only had this complaint twice in all the times I've done this game. In the first case, the person's exam grade, with the points, turned out to be 36, and in the second, 48.

Third, the last time I played the game, a formerly mediocre student answered an extremely difficult question. I immediately wondered whether a student in another group had shared their questions with him. More serious, it was apparent that some other students in other groups wondered the same thing. In teaching, it is always a mistake to assume students won't cheat, and this would be a way to do it. Of course, there are disincentives, since it benefits another team, which is probably why it never happened before, to my knowledge. It turns out that

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this was an easy problem to counter. I tend to know who knows whom in a class, and I simply started using questions for the group containing the student I feared might be cheating which were written by students that didn't associate with the student in question. I might mention that the student I was concerned about got an A on the exam, which probably meant that he simply had decided to study for this test.

There are some other advantages I haven't mentioned:

First, people who would normally be intimidated to discuss in front of a large class will talk in these groups. If they know the answer, their groupmates will give them plenty of encouragement to share their knowledge. And there is always someone in the group who is willing to report out the answer, so that takes that burden off the normally quiet student.

Related to this, it is a sad commentary on education that students who study hard are ostracized by their less motivated peers. In regular review sessions, I've seen students ostracized just because they were motivated enough to ask questions. That doesn't happen here. One always has her own group cheering her on, and it's the groups and people who don't know the material that look, and I believe, feel, a little foolish.

Last semester, I had two sections of Introductory Psychology. As has happened every year for 10 years, the earlier section had the higher mean score on the first exam. I don't know whether it is time of day or type of student that can fit

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the course in their schedule at that time, but the second section has always been a dud. I didn't play Psychological Pursuit with either section on the first exam.

On the next three exams, I played Pursuit with the later class, but not the earlier. With the earlier, I answered their questions, and used transparencies to review what I considered to be important concepts. The publishers supplied me with a computer disc of multiple choice questions. I had the computer select 100 questions at random for each exam. I didn't look at the questions until after the exam. I haven't checked for statistical significance yet, but the later class, for the first time ever, got somewhat higher mean scores than the earlier class. What really surprised me, though, was that the later class became much more lively throughout the term than the earlier class. And it happened after the first exam. Before that, they were the typical slugs. This was confirmed on the end of course student evaluations, when the later class gave me much higher evaluations than the earlier one. I usually get creamed by the later class.

A skeptic would say I fostered this. Maybe. It was unintentional if I did. I didn't expect it, or seek it. I didn't even think about it until I saw the student evaluations the following term. And if I did unconsciously do something different, it's bad for research, but it was great for them and me. And that's my point, even if this method of review is not

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better than any other method, even if that is true, it's worth using becaue of the enthusiasm it generates with very little effort or time on your part.

Can I interest anyone in a little game of Not So Trivial Pursuit?

How Item Order Affects Scores and Completion Times on

Multiple Choice Tests

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It is a common practice among teachers who give multiple choice tests to use forms with different orderings of the same items. In fact, instructors who do not take this precaution are inviting cheating among their students. Since my own classes are typically large--often over 100 students per section--I have been especially careful to vary the order of my items on the forms I hand out.

Let me describe the typical procedure I used--without thinking much about it--in preparing these different forms. I find, in comparing my methods with other teachers, that theirs were usually pretty similar.

First, then, I would go through the test bank, choosing and editing the items that I wanted to include on my test. Then I would prepare a first form the easy way: I would simply construct the test in the order the items appeared in the test bank. This order is what I call sequential

For other forms, I would scramble this order. I call these orders randomized.

Typically then, in each of my classes I used at least two different orderings of the same set of items: one in a sequential order; and one or more in a randomized order. As I mentioned, other instructors of large classes often reported similar practices when I asked them about their methods of preparing test forms.

There seems to be a silent assumption underlying this practice. The assumption is, of course, that the order of items does not affect the performance of students on a test. For years, I had been scoring alternate forms without expecting, or being aware of, any striking differences in test scores on the different forms.

However, one day I had an experience that made me think twice about my silent assumption. In one of my classes, I was giving a twenty-five multiple choice question quiz: the fifth of seven for that class. My practice was to hand out two different test forms, one sequential and one randomized, to alternate columns of students. Then each student turned in his or her test form, in a separate pile for each form, when it was completed.

During this particular test, one of the students handed in his quiz with the following remark: "I sure wish you'd give me one of those form A's next time. I think they're easier." As it turned out, I had been labeling the sequential order form A and the randomized order form B.

After that experience, I became curious about whether there really might be some effects of item order on the test performances of my students   I decided to carry out an experiment to assess these effects. The basic design of the experiment will now be described.

The independent variable, of course, was item order: sequential or randomized. This variable was treated as a repeated measure. This is how the procedure worked. Two regularly scheduled twenty-five item tests were included in the design. Each test covered seven chapters from the textbook (Benjamin, Hopkins and Nation, 1987). These tests were optional, covered half of the

course each, and made up for the lowest quiz score in that half of the course. Virtually all students in the class took both tests in order to improve their point total for the course.

For each test, a sequential and a randomized form were given. The sequential order was identical to the order in which the material was covered in the lectures and the textbook. For the random order, the same items were scrambled by computer.

Note that one group of students, designated Group A, received the sequential form on the first test and the random form on the second test. The other students, designated group B, were given the random form first, and then the sequential form on the second test. There were a total of 98 students in the experiment.

I decided to look at two different dependent variables. The first of these measures was test score. This score was simply the percentage of items correct, based on a total of twenty-five items.

The second dependent measure was <u>test completion time</u>. I decided to introduce this variable, because I expected that quiz scores might not be the most sensitive measure of the difficulty of a given item order. Naturally, all students want to do the best they can on a test. If one order is more difficult than another, students receiving this order might well take the additional time and effort required to overcome this extra difficulty. Therefore, differences in item order might be reflected in completion times but not necessarily in quiz scores.

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To measure completion time, I started all the students on the test at the same time and also began a timer. The completion time was then written on each student's quiz test form as it was handed in.

I should point out that these procedures required considerable organization, as well as the help of two assistants -- work study students who had already had my class in a previous semester. The ninety-eight students were assigned to specific seats; and tests were pre-labeled with the students' names to make sure everybody received the correct form. In addition, quizzes were sealed in envelopes to insure that all students started at the same time. However, it took some vigilance to keep the anxious ones from opening the envelopes too soon, and starting on their own. When I did start one of the tests, one student tore open her envelope with such zeal that she ripped her test booklet in two and had to be given a new one. You can see, then, that collecting data for this type of in-class experiment was a bit challenging.

Before I tell you about the results of this experiment, let me briefly discuss my hypothesis. I expected that the sequential order would be easi r for students than the random order. Test scores might be higher for students taking the sequential form, I thought. But I expected this difference might be small, because of the understandable motivation of students to score as high as possible no matter what order they received. However, I did think that completion times might be considerably longer for students taking the randomized order.

Let me now lay out some rationales for my hypothesis, along with a "devil's advocate" view that predicts somewhat different results. These rationales come from well-known theories of memory.

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First, let's consider the encoding specicity theory of Tulving (e.g. Tulving and Thompson, 1973). According to this theory, items are encoded into memory in a particular context of other information. Thus, the most effective memory cues for any item consist simply of the information present when the item was originally encoded.

If we apply this view to the problem of test item order, it would predict that the sequential test order would be easier than the random. In the sequential order, a given item is preceded immediately by related items. These related items are drawn from material which was covered at about the same time as the information pertaining to the given item. Therefore, the sequential order would be easiest because adjacent items provide encoding-specific memory cues.

Next, let's look at Atkinson's restriction of seu. n set theory (e.g. Hopkins & Atkinson, 1968). According to this viewpoint, the most effective retrieval cues provide information which restricts the number of possible items which must be searched in long term memory storage. Note that this view also predicts that a sequential order of test items should be easiest. In remembering information related to a particular question, adjacent items in the sequential order would tend to limit the topic area of the information to be searched in memory.

Both of these memory theories, then, suggest an advantage to presenting items on a test in the same order that the material was covered in the course. This advantage would be reflected in either higher test scores, shorter completion times, or both.

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It is possible, though, to argue effectively for the advantage of random ordering. A good "devil's advocate" argument focuses on the attention given to each item. In sequential ordering, students know after completing one item the type of item to expect next. Therefore, they might pay less attention to each i m. However, randomizing the items might force more time and attention spent on each. Like the other view,oints, this devil's advocate theory would predict longer completion times for the random order. However, it would also predict that scores would be higner for the randomized order, because students would be attending better to the items.

We can see, then that there are reasonable arguments which favor either type of item ordering on a test: sequential or random. With that idea in mind, let's turn to the results which were actually obtained in my experiment.

There was a small difference in the mean time it took to complete the sequential and the randomly ordered forms. The students receiving the sequential order took an average of 751 seconds, or about 12 minutes and 31 seconds, to complete the twenty-five items. For the students receiving the random order, the test required about 19 seconds longer; about 12 minutes and 50 seconds.

This difference is in the direction I predicted, but is not significant or near significant. The F-value was 2.23. The group factor was not significant either. However, the interaction between group and item order was significant at the 1 percent level, with an F of 9.79. This interaction basically indicates that the first test required more time than the second.

To summarize then, there is no particular support for the notion that item order effects test completion time.

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Let's turn now to the test score data. Here we find a near-significant
effect of item order. The average score on the sequential order was about 69%.
However, the mean score on the random order was only about 66%. This 3 percent
difference, though small, is almost significant, with a p-value at the 8
percent level.

There was no effect of Group, but again, there was a significant
interaction between Group and Item Order. This effect reflects simply a
difference in difficulty between the two different tests.

To summarize, there is some marginal support for the idea that test scores
are slight y higher when items are arranged in sequential, rather than random,
order. The difference I obtained was only about 3%. Assuming this difference
is solidly reliable, which I plan to test further, a 3% difference is something
to think a little about. I don't know about your students, but mine would
consider a 3% difference in their score important. For instance, in my final
grade cut-offs, a course total of 74% of the points would be a C, where a total
of 77% of the points would be a C+. I now understand the student who told me
he sure wished he could get another form A next time.

How might a teacher alleviate possible item order effects? A couple of
methods come to mind. One technique would be to make sure every student
received about an equal number of sequentially and randomly ordered quizzes or
tests. This is what I did in my experimental design, because each group
received one sequential test and one randomized test.

Another technique to combat order effects would be to approximate
sequential ordering on all forms. For example, an effort could be made to
group similar items together on every test order, even though none of the

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orders was strictly sequential. This advice, by the way, is sometimes given in instructor's manuals on devising tests.

I should point out that I am continuing my research on item order effects. My next objective is to assess the effect on a test with more items. Twenty-five may not be enough to show a clear effect of order. However, my final exam has 75 questions. I am now working on adapting and expanding my methods for this longer test.

Perhaps I should end by thanking the student who asked for more form A's. Maybe he's on to something. I'll know more as I do further experiments. In the meantime I expect to stuff many more envelopes with tests, and to have a few more accidentally ripped into two at the signal of "Start your tests!"

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Cognitive Psychology Meets the NCC Faculty

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COGNITIVE PSYCHOLOGY MEETS THE NCC FACULTY

In her article Taking Teaching Seriously, K. Patricia Cross
of Harvard Graduate School of Education describes the current forces
toward change confronting college faculty. She lists, as forces,
adults and low-performing students, whose entrance into college
life necessitates good teaching; the new interactive technologies;
the growing interest in assessment and program evaluation (that will
ultimately provide continuous feedback on the processes of teaching
and learning); a new emphasis on alterable variables in educational
research; the current lack of mobility for faculty members; and low
faculty morale.

Identifying the forces for change, she next goes on to surmise
that, given these forces, we are about to take teaching seriously.
What constitutes excellent teaching? How do we measure this?
Are there methods of teaching more successful than the lecture?
How can we maintain our morale and enthusiasm as faculty over many
years in the classroom? In searching for answers to these and
similar questions, Cross makes a bold and novel proposal -- that
research on teaching and learning be done in thousands of classrooms
across this nation, by classroom teachers themselves. Her contention
is that laboratory research by cognitive psychologists is being
driven by questions that are different than those needed for practice
in the classroom, and so college teachers need to do their own
applied research.

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While I like Cross's suggestion that faculty become classroom researchers, two serious objections come to mind. First is the difficulty of doing effective, tightly controlled research studies outside of a laboratory setting, and second is that cognitive psychology already has much to offer the college classroom teacher, though the translation process takes some effort.

What can cognitive psychology offer the college faculty? As a cognitive psychologist at Nassau Community College for 13 years, I set out to explore this question this fall by offering a ten week course to the faculty entitled The Teaching/Learning Process (as part of our new Faculty Development Program). The course was designed with the following aims in mind:

1) that faculty begin to explore and learn to develop an expanded range of general cognitive goals for their.classes beyond comprehension of course content (such as development of problem-solving skills or Bloom's taxonomy);

2) that faculty become aware of the cognitive processing model of learning, and of the range of "mental operations" called for by different learning tasks (as well the range of "operations" called for in the different disciplines);

3) that faculty look at different models of teaching (lecture, interactive lecture, discussion, collaborative peer learning, etc.); and see the connections between the teaching method, and the type of cognitive processing (mental operations) the students consequently engage in;

4) that faculty review the general differences between successful and nonsuccessful students in terms of their cognitive

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processing, and think about how to lead their students to develop the cognitive patterns of more successful students (see section on "how students learn" below);

5) that faculty become aware of the influences of the classroom emotional climate, the psychodynamics of the classroom experience, the implicit and explicit classroom contract, and how these variables effect the learning process;

6) that faculty learn how to install tighter feedback learning loops as part of their classroom work so they can check on students' mastery at frequent intervals;

7) that faculty become familiar with the communication techniques that increase the probability that students will integrate the material presented into their own cognitive structures;

8) that faculty have the opportunity to practice some of the learning, remembering and study skills which can easily be taught to students;

9) that faculty have the opportunity to problem-solve their own teaching process, identifying areas in which they want to develop different methods, assessments, attitudes, etc.;

10) and finally, that faculty, taking a close look at the "what", "how", and "why?" of each classroom encounter, try out new methods and techniques, guided by the presented cognitive framework.

A more concise statement of the aims for this project is that faculty learn to select teaching methods and learning tasks that ensure that their students practice the "mental operations" of successful students in general, as well as the specific "mental strategies" of experts in the specific discipline. In developing tighter feedback learning loops (i.e. Have the students mastered

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the concept/skill or not? How can I test for this?), faculty

will discover that almost every classroom encounter provides the

opportunity for the faculty to track the development of the

student(s) cognitive processes, and to facilitate this development

via feedback. It is expected that faculty will eventually see

the need for, and then develop formal assessment tools that track

each student's progress in cognitive development during the

semester.

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The Course Outline

The pilot course was divided into 10 sessions listed below:

    Week 1.   Goals

         2.   Who are our Students?

         3.   The Classroom Contract

         4.   How Students Learn

         5.   Motivating the Unmotivated

         6.   Critical Thinking

         7.   The Lecture

         8.   The Discussion

         9.   Assessment/Testing

        10.   New Directions

These titles were selected because they seemed more familiar
to the faculty currently than more discipline-specific
titles. (Feedback is already necessitating a rearrangement
of the topic sequence, and a retitling of some topics for
the spring semester.) Each topic is being presented twice
weekly. Faculty have the option of "dropping in" to any
given session; or attending most sessions, keeping an
applications journal, and doing the readings, in exchange
for a letter from the Dean of Instruction's Office. It is
expected that next semester those faculty who are attending
the full semester will develop individual agreements with me

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as to _what_ they would specifically like to accomplish in their classes, and _how_ they will accomplish this. (I will make myself available as cognitive classroom consultant if needed.)

Sessions

Goals

In this session, an expanded range of general goals was presented, including development of students' lifelong learning skills, useful thinking skills, problem-solving skills, world-view, and self-image. In addition long-term goals specific to a given discipline were discussed (e.g. one biology professor stated that he wanted his students to be able to enjoy popular articles about biology, and be informed consumers and decision-makers in regard to future biological breakthroughs). Faculty were asked to define some of their long-term goals, and strategies were presented to relate these long-term goals to classroom teaching strategies. The issues raised included the questions, "What are the students' goals?" and "How similar/different are they from faculty goals?" Also discussed were the characteristics of effective teachers, by having faculty describe models from their own personal history. The aim here was to have faculty set goals for themselves as well as for their students.

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Who Are Our Students?

In this session, faculty shared their impressions of students. The topics discussed included how individuals gather information about students and what kind of information is gathered. The faculty then described the informal classification system each uses to evaluate students. The most common category turned out to be the degree to which the student seemed motivated. No one present at the seminar thought in terms of the following categories: active or passive learner; type of difficulty in past courses; student's self-attribution as a learner; student's prediction of success in this course; student's ability to identify his own learning problem; student's knowledge of study/reading skills, etc. This type of information, it was decided, could easily be gathered via questionnaires, and used as the basis for some first day practice of, and advice about, learning skills for the student. It was suggested that on the first day students should define for themselves a procedure to follow if they begin to feel less motivated to succeed during the semester.

The Classroom Contract

In this session the explicit and implicit classroom contract (set of agreements) was discussed, including the relationship (or lack of it) between faculty expectations and student expectations. A method was presented whereby

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students could develop (in small groups) a set of questions
to ask the faculty member about classroom procedures. Then
students would identify potential problems they might have
with the contract, and then brainstorm solutions. During
the Classroom Contract session, faculty also had the
opportunity to identify and problem-solve the current
problems they were having with their contracts, as well as
any problems they were having due to their explicit and
implicit agendas (example: one faculty member discovered
she was working too hard to convince students to stop
smoking).

The second part of the session was used to discuss
issues related to classroom climate, including how to
establish and maintain rapport (trust) in the classroom, how
to arrange the context so that students participate, how to
self-assess the classroom process on an ongoing basis, and
how to read emotional weather patterns.

How Students Learn

In this session, the cognitive model was presented,
including the ideas of input, transformation, and output,
knowledge structures (data bases), mental operations and
mental strategies (composed of mental operations), models of
reality, feedback loops; and Piaget's model of cognitive
development. Next, faculty were presented with charts of
the mental operations and strategies of successful students

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(questioning, forming hypotheses, analyzing, setting

learning goals, developing feedback loops, ~~testing~~ *testing*) and

with the "mental operations" and strategies of excellent

problem-solvers in everyday life. Faculty were then asked

to describe the mental operations and strategies of experts

in their own field, and the operations and strategies their

students engaged in during specific teaching/learning

sequences in the classroom and while studying. To end,

faculty were asked to compare categories and then rework one

of their own lessons to allow students to practice a set of

mental operations useful for achieving one of the faculty

member's long terms goals. (For example, one faculty member

decided to ask students to bring in articles from the New

York Times about a current topic of interest, to underline

important concepts, to identify problems posed, analysis of

causes of problem, ideas for solution, difficulties with

implementation. Along with analyzing the article, students

were asked to describe out loud the process each used in

knowing what was the main concept, etc.)

Motivating the Unmotivated

In this session, to be run after the deadline date of

this article, faculty will look at motivational concepts

(goals, motives, energy, motivate, motivation). We will

then use the problem-solving method of teaching to actively

identify students'/our own difficulties with getting and

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staying motivated. Next, given that successful students are usually _active_ learners, each participant will be asked to reframe one of his/her course sessions into the problem-solving format (thereby setting up the external conditions for students to practice being active learners/problem-solvers).

Critical Thinking

This session will be devoted to categorizing and comparing critical (reframed as effective or useful thinking) vs. noneffective thinking. Different types of thinking (composed of different mental operations/ strategies) will be elicited from faculty (e.g. inductive, deductive, convergent, divergent, creative, critical or evaluative) and an attempt will be made to define when it is useful to practice a given thinking strategy in the classroom (related to the thinking patterns of successful students and of expe. ts in the discipline). This session is essentially a furthering of the session on "how students learn." Emphasis will be placed on how to draw out students' current thinking patterns, and how to gently offer them more useful thinking strategies. For the sake of cognitive confusion, the problem-solving type of thinking will be used as the teaching strategy in order for faculty to specifically identify poorly developed thinking patterns and develop gentle attack strategies to evolve students' mental operations.

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Lecture

In this session, faculty will develop guidelines for planning and carrying out an effective lecture. Issues discussed will include: "How many concepts?" "How much detail?" "What kinds of examples?" "How do you know that your students are understanding?" "How do you help them integrate and remember the material?" Faculty will be given the opportunity to identify their own specific problems with lecturing, and use the group for feedback.

Discussion

In this session, faculty will discuss the advantages and disadvantages of different discussion formats (consensus building, arguing, freewheeling, integrating, analyzing, critiquing, etc.), and will develop criteria for evaluating the effectiveness of a given discussion session.

Assessment and Testing

In this session, faculty will consider the similarities and differences between assessing students for a grade and assessing as a feedback tool. Faculty will then use group brainstorming to develop assessment criteria relevant to a given faculty member's goals for a particular course/ student.

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New Directions

In this session, faculty will review guidelines for developing effective learning groups. Faculty will then form into learning groups, themselves, with the aim of learning something new together.

As the semester proceeds, there will be changes in course format, necessitated by continual feedback from the participants and college faculty as a whole concerning the effectiveness of the seminar. If anyone would like further information, please contact me.

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Reference:
    K. Patricia Cross, "Taking Teaching Seriously," paper presented at 1986 National Conference on Higher Education in Washington, D.C.

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Unblock: Enhancing Creative Thinking

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Unblock: Enhancing Creative Thinking

The definition of creativity is a source of disagreement among the psychologists who are interested in its study. Creativity has been defined as the ability to produce unique and novel ideas (Guilford, 1962) and as the ability to see an old problem in a new way (Van Gundy, 1982). Some researchers believe that creativity can be identified with respect to certain specific features of products, personalities or ideas; others suggest that its proper definition is the quality of the response the product or idea elicits from the observer, e.g. suprise or delight (Amabile, 1983). Still others insist that creativity cannot be defined; its essence is unknown and may be unknowable.

It is agreed that creative behavior includes such activities as problem solving, composing, inventing, designing, and planning. All people possess creative ability, differing only in the extent to which they have developed this ability (Van Gundy, 1982); those who frequently exhibit these behaviors are recognized by others as creative.

Creativity is not synonymous with I.Q. Abilities which are believed to underlie creativity are ideational fluency, inductive reasoning, convergent and divergent thinking, spatial orientation, and visual and auditory

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memory (Anastasi, 1968). Through his work in factor
analysis, Guilford (1962) determined that creative
thinking is composed of the following elements: (1)
sensitivity to problems - seeing needs, seeing the
unusual; (2) fluency of associations and ideas; (3)
flexibility - freedom from perceptual and cognitive
sets; (4) originality - uncommonness of response; (5)
penetration or remote associations; (6) analysis - the
understanding of pertinence; (7) synthesis - closure
ability; (8) redefinition - the shifting of function.

The most widely used test batteries are the
Torrance Tests of Creative Thinking (Torrance, 1974).
The tests call for both written and drawn responses,
which are scored to assess the following criterion
components of creativity: (1) fluency - the ability to
produce a number of different ideas; (2) flexibility -
the ability to produce a variety of types of ideas; (3)
elaboration - the ability to develop or fill out one's
ideas; (4) originality - the ability to produce unique
or statistically infrequent ideas. A number of studies
(Amabile, 1983; Torrance, 1974; Van Gundy, 1982)
indicate that practicing tasks which draw on these
abilities improves performance on the Torrance and other
tests of creative thinking.

Obstacles to Creative Thinking

If we all possess the ability to think creatively,

why then do we so often feel blocked when we sit before

a blank piece of paper or computer screen struggling to

design a new course, plan a lecture, or write up our

research results? A number of writers have identified

obstacles which inhibit the free flow of creative

thought. Van Gundy (1982) has collected and organized

them into five major categories: perceptual, emotional,

intellectual/expressive, cultural and environmental

obstacles.

Perceptual obstacles are similar to cognitive and

perceptual sets; they limit our flexibility in looking

at situations, and block our ability to see the problem

situations in unusual ways. To combat perceptual

obstacles, avoid stereotyping. Once labels are attached

to people or situations, it's hard to remove them.

Think about how someone from another academic discipline

would approach your problem; ask others for their

perceptions. Experience the problem as much as

possible; think about how you might taste, hear, or

smell something you would ordinarily only see and touch.

Isolate the real problem you want to solve; don't be

distracted by related concerns. Practice making remote

associations; choose objects in your environment and ask

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what they remind you of (Van Gundy, 1982).

Emotional obstacles are those internal feelings and pressures that interfere with our ability to think clearly and freely. To avoid feeling overwhelmed by a problem, break it into smaller parts and concentrate on one part at a time. Practice patience. Creative thinking takes time; include time to incubate, and time to play, when you are planning to work on a problem. To deal with fears of failure, risk-taking, or criticism, see the work of Ellis and Harper (1975) and Burns (1980) for cognitive strategies to control your fears. Remember that we all fail sometimes, and that if we never try, we'll never succeed. Criticism is not necessarily negative; it often contains helpful suggestions which can be a spur to more creative thinking. Finally, never reject an idea outright, no matter how silly or outlandish it may seem. Always ask yourself if there's something good about it. Even the silliest ideas are an important link in your thinking process and can lead to important associations.

Intellectual/expressive obstacles are ways of thinking about problems which limit our ability to solve them. Analyze the problem to choose the most appropriate "language" for attacking it. Should our strategy be verbal or figural? Don't limit yourself to

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one strategy; try diagramming, outlining, describing it
before deciding which works best. Gather information
about the problem before you begin to strategize. Keep
collecting information and checking its validity as you
go along (Van Gundy, 1982). Reflect on the
problem-solving process as well as its content.

Cultural obstacles are well-learned standards and
methods of operations that can impede creative thinking.
To combat cultural obstacles, don't be afraid to break
from tradition; remember that new solutions are "new"
solutions! Develop a questionning attitude; keep asking
"Why?" and "Why not?"; hypothesize for the fun of it.
Don't ignore intuition and feelings in favor of logic
and reason - consider all ways of knowing. Look for the
funny side of things; humor helps us relax and see
things from a different point of view. Give yourself
permision to fantasize and daydream (Van Gundy, 1982).
Mortimer Adler complains that Americans "don't know how
to idle", that we turn on the television instead of
"thinking for pleasure". So, learn to fight
"workoholism"; every minute need not produce something
tangible - good ideas need time to incubate.

More people complain of the environmental obstacles
than of any other type. Lack of time, lack of support,
and distractions are obvious and annoying barriers. Use

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problem solving and time management techniques (McCay, 1959; Winston, 1978; Goodloe et al, 1984) to combat environmental obstacles. We suggest Mahoney's (1979) personal science problem solving technique for clear behavioral suggestions. Don't let environmental obstacles become an excuse for procrastination (Chrisler, 1987, March); use problem solving techniques to circumvent procrastination. Set aside blocks of time for working on the problem. Incubate while driving or ironing. Find ways to minimize distractions, and when they occur, use them to suggest possible solutions to the problem you're working on! Actively solicit support for your creative work. Organize a group of people doing similar work and meet to report on progress and to support each other. Show your family or colleagues how they can benefit from the solutions you are working on. Finally, avoid over-reliance on experts. Remember that they are probably relying on the traditions you're trying to get away from! Trust your intuition or, at least, get a second opinion.

One Writer's Solution (CW)

While working on my master's degree in poetry I had a baby, which sufficiently disrupted my life that I found myself unable to write except sporadically, and then mostly in my journal. A good deal of what I was

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writing had to do with the difficulty of finding the
time and energy to write. The problem was compounded by
a lack of space. We were living in a one bedroom
apartment in Manhattan, the baby's crib and dresser had
replaced my desk and typewriter, and I felt I had no
place to work.

The idea of the necessity of having a definite time
and place to write is an important one. There is a
tendency to view writing as a luxury; something to work
on when the dishes are done, or the laundry finished, or
the papers corrected. As Sue Grafton (1988)has pointed
out, "to be productive, we have to make writing part of
our daily lives."

In order to make this possible, it's necessary to
set aside both time and space. A desk of your own, even
in the corner of a room, where you go to work and to
work only, has very positive effects. Dorothea Brande
(1948)insists, "If you steadily refuse to loose yourself
in reverie at your work table you will be rewarded by
finding that merely taking your seat there will be
enough to make your writing flow."

Finding time can be more difficult than arranging a
work space. Grafton (1988) recommends setting aside two
hours a day for writing and she lists a number of ways
of finding more time. Her suggestions include staying

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up an hour later, getting up an hour earlier, using your
lunch hour or commuter time, setting aside a weeknight
(as you would if taking or teaching a course), and
reorganizing your weekend and leisure time.

I set aside the hour or two when my son napped in
the afternoon, and set up my desk in our large front
hall. I found myself looking forward to that time and
to the work waiting on my desk. By keeping to this
schedule, as much as possible, my work slowly progressed
and I was able to finish my thesis.

Organizing a work space and scheduling time is all
well and good for getting started, but what about those
times when you are working splendidly and suddenly you
find yourself stopped - absolutely and completely. Many
authors advise against forcing yourself to write at this
point. But those same authors will, in the next breath,
suggest doing that very thing in the form of notes and
ideas about whatever has you blocked. The very act of
writing can often set the wheels in motion, especially
if the writing is not "for keeps". It's important not
to be critical at this point, to just keep working
without judging or refining; all of the polishing can
come later.

Another way to deal with the experience of writer's
block is through cognitive restructuring. It's possible

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to think of the block as a signal, an indication that all is not well with the work. Perhaps you need more information about a particular point or maybe you are headed in the wrong direction. Or maybe you don't have any idea of where you are headed. It can be very difficult to write if you don't know what it is you are trying to say.

Cognitive restructuring can also be helpful when negative comments on your writing come back from journal reviewers and editors. Ask yourself, "Where else can I get free feedback from experts in the field?" (Rothblum & Cole, 1988, March) Remember that they don't know who you are so they won't think badly of you. Use their suggestions to revise your manuscript to resubmit or send elsewhere.

Conclusion

The first step to unblocking is to decide to work on the problem and set aside time to do so. Time, as we have mentioned above, is critical to the creative process. You will need time to analyze your strengths and weaknesses, time to figure out which obstacles affect you the most and choose strategies to minimize their influence, time to practice generating ideas and solutions, and then time to work on the problems you have been wanting to solve.

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We suggest that you begin with the exercises we have given you. These will help you to see where you need to put your time in developing your resources. These self-tests were developed by Van Gundy (1982) whose book <u>Training Your Creative Mind</u> and Torrance's (1965) book <u>Rewarding Creative Talent</u> contain exercises designed to provide the opportunity to practice creative thinking in a non-threatening, playful atmosphere. We recommend them highly.

Try to look at the obstacles in a positive way. You can overcome them if you try. Practice and patience will be required. Remember that it took a long time to build up these obstacles, and so may take a long time to break them down. However, you don't have to wait until they're broken down to start working on the projects you have planned. Perseverence will pay off.

Finally, do set aside time for working on your creative projects. Writing, especially, takes more time then you may initially expect. Taylor and Martin (1987) recommend that all academics plan to spend 10 hours per week writing and editing their work. If that seems like a lot to you, work up to it slowly. If you can spend 10 hours each week on your creative projects, it won't be long before you see yourself, and others see you, as a creative person.

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Appendix A

Creative Thinking Obstacles (Van Gundy, 1982)

<u>Perceptual Obstacles</u>

1. Using overly restrictive problem boundaries

2. Inability to isolate the problem

3. Ignoring familiar sensory inputs (saturation)

4. Stereotyping

5. Functional myopia

6. Failure to use all the senses

7. Difficulty in seeing remote relationships

<u>Emotional Obstacles</u>

1. Feeling overwhelmed by the problem

2. Fear of failure

3. Fear of criticism

4. Fear of taking a risk

5. Desire to succeed too quickly

6. Low tolerance of ambiguity

7. Failure to incubate

8. Failure to suspend judgement

<u>Intellectual/Expressive Obstacles</u>

1. Failure to use appropriate problem solving language

2. Use of rigid problem solving strategies

3. Lack of information or use of incorrect information

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Cultural Obstacles

     1. Taboos

     2. Tradition

     3. Lack of a questioning attitude

     4. Over-emphasis on competition or cooperation

     5. Over-emphasis on reason and logic

     6. Belief that fantasy and intuition are a waste
       of time

     7. Lack of humor

Environmental Obstacles

     1. Lack of time

     2. Lack of support

     3. Distractions

     4. Autocratic bosses

     5. Over-reliance on experts

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Appendix B

Creative Problem Solving Capability Rating Scale

(Van Gundy, 1982)

Instructions: Using the scale that follows, rate
yourself on each item according to how capable you
believe you are in performing the activity described.
Your first reaction is likely to be the best.

(1) Not very capable   (2) Below average

(3) Average   (4) Above Average

(5) Exceptionally capable

How capable do you consider yourself to be when it
comes to:

1. Analyzing problem situations? _____

2. Being aware of and sensitive to different
   problem elements? _____

3. Being aware of problem constraints? _____

4. Testing major problem assumptions? _____

5. Using your different senses to help analyze the
   problem or generate ideas? _____

6. Rapidly generating ideas? _____

7. Deferring judgement when generating
   ideas? _____

8. Viewing a problem from many different
   perspectives? _____

9. Making remote associations among problem

elements? _____

10. Forcing together two or more ideas or objects
to produce something new? _____

11. Seeing something positive in every idea? _____

12. Evaluating and selecting ideas? _____

13. Anticipating possible solution
consequences? _____

14. Tolerating ambiguity? _____

15. Gaining acceptance for your ideas? _____

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Appendix C

Creative Thinking Training Readiness Scale (Van

Gundy, 1982)

Instructions: Using the following scale, indicate the extent to which each item is a concern to you in regard to your readiness for a creative thinking training program. For example, if you believe that you have plenty of time to devote to becoming more creative, you give that item a score of 5.

(1) Critical concern   (2) Important concern

(3) Moderate concern   (4) Mild Concern

(5) No concern

1. Time availability _____

2. Committment to becoming more creative _____

3. Your willingness to take risks _____

4. Support (if needed) to work on creativity _____

5. Your willingness to persevere _____

6. Environmental distractions _____

7. Your openness to new experiences _____

8. Your desire to improve yourself _____

9. The extent to which you have clearly defined
   your life goals and objectives _____

10. Your overall motivation level _____

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Teaching Psychology of Learning:
The Benefits of Student Discovery

by

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     I frequently teach a college course in the Psychology of
Learning. This course is designed to provide a broad background
and thus covers human as well as animal learning. While I enjoy
the topics which are included, this enthusiasm is not always
shared by the students particularly when the discussions deal
mainly with animal studies. This is, of course, unfortunate for
some of the clearest demonstrations of learning phenomena can be
found in the animal literature.

     Part of the problem is that a substantial percentage of the
students are really looking for an applied learning course, such
as Behavior Modification, rather than a course which has a strong
theoretical emphasis.   In addition, the course is undoubtedly
demanding. There is a great deal of information to be mastered
and thus there is a constant danger of students concentrating
upon details and failing to understand general concepts.   Also
there are numerous issues for which a definitive solution is not
known. While some students find this to be stimulating, others
find the presentation of conflicting theories without the ability
to designate a clear "winner" to be disturbing.   Finally, the
most generous description of which I am aware for texts in the
area of learning is "definitely not exciting".

     One commonly used solution to these issues is to include a
laboratory in which each student is responsible for shaping a
series of simple behaviors in a rat.   The laboratory which I
include requires that students shape a lever-press response, and
then obtain a FR-4, a basic discrimination and a short chain.
This is clearly a rewarding experience for most of the students,
but I have found three clear drawbacks.   First, some of the
assigned behaviors are time-consuming to obtain and, as a
consequence, the students' initial enthusiasm can be short lived.
Second, the exercises are not sufficient for them to gain an
appreciation for the ability of schedules of reinforcement to
control complex behavior.   Finally, the students know what is
supposed to happen at the beginning of each lab and,
consequently, while there is frequently evidence of student

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satisfaction with a job well done, there is only infrequently any sense that they feel that they have actually discovered something new.

I have made several attempts to overcome these deficiencies. The first was an assignment in which students were to go to the Buffalo Zoo, which is located approximately one mile from campus, and prepare a behavior modification routine for one of the animals. The assignment required, more specifically, that the students begin by learning about the natural behaviors of the animals and then devise a system that would result in the occurrence of these or similar behaviors in the zoo setting. I assumed that the students would appreciate the chance to apply the material learned in the course and I looked forward to approaching the zoo staff with procedures for making the exhibits more stimulating for both the animals and the visitors.

The results did not live up to my expectations. The first paper, for instance, proposed to modify the activity level of one of the zoo's pythons by employing a FR schedule. It was completely overlooked that pythons in the wild remain quiescent for long periods and thus the behavior exhibited in the zoo might not be "abnormal". Further, the type of reinforcer was not clearly specified nor was the response. Finally, the student was apparently unaware that pythons frequently go extended periods without eating and that this characteristic would have to be addressed in designing a behavior modification program. It became clear, in fact, that most of the students viewed the assignment as one more hurdle in an already difficult course rather than an opportunity to creatively employ what they had learned.

A solution which I have found to be more effective is to enable students to discover as many as possible of the basic learning phenomena instead of simply reading about them. I have been fortunate in that my department has an abundant supply of 28 volt electromechanical equipment. What I do, specifically, is to utilize the equipment to present the students with a series of challenges, and ask the students to find the solutions or rules. At first the problems are simple, for instance, small fixed-ratio schedules, and the solutions came quickly. After a few weeks, however, more complex schedules such as variable ratios, differential reinforcement for low rates and multiple schedules are introduced. Other phenomena such as the primary-recency effect can also be demonstrated.

I have found that it is not necessary to give credit for participating in these exercises. The students enjoy the intellectual challenge and clearly appreciate the chance to discover, rather than be told about, learning phenomena. The solution to each "problem" is always available next to the apparatus. Nevertheless, students will frequently work in teams for 30 minutes or more in order to discover the solution and they

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take pride in not having had to check the answer.

The result is a much more interested, involved class of students. For instance, when the assigned reading covers a phenomenon which the students have already discovered, there is frequently a discussion of the extent to which they exhibited patterns of responding which were similar to those illustrated in the text. Also, following equipment failures, the students can testify from first hand experience about the emotional components which accompany "experimental extinction". Further, when the growing emphasis upon cognitive issues in learning is discussed, the students spontaneously point out which strategies they employed to solve some of the more complex problems. This often leads to a consideration of whether the laboratory rats are capable of utilizing a similar approach! Finally, the students seem to appreciate the rats they are working with better. After taking 20 to 30 minutes to solve one of these challenges, the students seem more tolerant when it takes several sessions for their rats to master one of the simple demonstrations.

It should be recognized, however, that some of the student-oriented exercises have not been successful, at least in the manner that I anticipated. The most obvious example occurred this semester when I attempted to illustrate the autoshaping phenomenon. I have previously utilized this procedure with pigeons and the text described the behavior in some detail. Nevertheless, only one student out of approximately 30 exhibited this behavior and then only intermittently. This discrepancy between the animal literature and student behavior did, however, result in a very stimulating discussion in class!

In summary, by giving students the opportunity to engage in an active discovery process instead of relegating them to a side-line position, I have found that there is both a heightened interest and an enhanced ability to appreciate the relationship between topics covered in the course. In the near future, I hope to improve upon the current procedures by making use of desk-top computers instead of electromechanical relays. This change would clearly be more efficient since equipment would not have to be continuously reconstructed and it would have the added benefit of providing a way for students to thoroughly enjoy what for many of them would be their first experience with a computer.

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Multipurpose Use of Computers in the
Teaching of Introductory Psychology

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Teaching of Introductory Psychology

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Getting cadets ready for class is perhaps one of the
greatest, and most important, challenges that faces an
instructor in the Department of Behavioral Sciences and
Leadership, at the United States Military Academy. If
cadets are prepared, classroom periods can be used for
discussions, demonstrations, skits, and integration of
material found in the reading assignments. If cadets are
not prepared, classroom periods often become lectures that
simply re-hash facts that are already adequately covered in
the textbook. This not only fails to reinforce the students
who have prepared, but prevents both the instructor and
students from accomplishing the stated lesson objectives.
This is particularly true in the introductory course in
General Psychology. The purpose of this presentation is to
outline for you how faculty members, who teach introductory
psychology at West Point, have integrated computers into the
course, in an effort to facilitate students' preparation for
class. I will also touch on other ways computers are being
use to aid cadet learning, summarize the lessons learned,
and briefly discuss future plans for computer assisted

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instruction within the Department of Behavioral Sciences and Leadership, at West Point.

To begin with, I will take few minutes to describe the teaching environment at West Point, since it is unique in many ways. The United States Military Academy is specifically charged "to educated and train the Corps of Cadets so that each graduate shall have the attributes essential to professional growth as an officer of the Regular Army, and to inspire each to a lifetime of service to the nation (Palmer, 1987). In support of this goal, and at the suggestion of General Eisenhower (1946), the Department of Behavioral Sciences and Leadership was created to, in his words, "much improve leadership and personnel handling in the Army." The department carries out this mission by providing a broad curriculum in the behavioral sciences, the central focus being leadership (Prince & Cage, 1985). Among the department's offerings is a core course in Introductory or General Psychology, which is taken by all cadets in their Fourth Class or Freshman year.

Ninety-seven percent (97%) of the academic faculty at the United States Military Academy are commissioned officers, many of whom graduated from West Point. Of those faculty members who are military, eighteen percent (18%) are tenured and permanently assigned to West Point, the other eighty-two percent (82%) are non-tenured and teach for three years, then move on to another assignment. Classroom size is limited to about 15 cadets per class, with each instructor

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teaching four classes. The Introductory Psychology faculty consists of one tenured professor and ten non-tenured instructors.

To enhance the preparation for officership provided cadets by the Department of Behavioral Sciences and Leadership, it was decided, in recent years, to upgrade the learning outcomes of the introductory course. Because officers must be able to make well considered decisions in an ever-changing world, course work now emphasizes the understanding and use of general principles rather than mere recall of information. Even at this introductory level, therefore, cadets are required, and must be helped to develop higher level cognitive skills. Aiding the development of these skills demanded careful course design and the rigorous training of both instructors and students.

The General Psychology course was developed in accordance with the systematic design of instruction procedures (Dick & Carey, 1978). From the outset, cadets have a clear statement of what they are to do and are given clear criteria for evaluation. They are also evaluated against these standards and not against each other. The first step in the systematic design of instruction is to formulate a goal or objective for the course. And since there is a committee of at least ten psychologists involved, this is no easy task, as you might imagine! The goal for students of the General Psychology course taught at West Point is stated as follows: "Given a situation, use your

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knowledge of psychology to tell why people are behaving as
they are, why their behavior persists, if it does, and how
it could be changed, if at all." (Basically, what we want
is for the cadets to be able to account for behavior they
observe and to be able to apply psychological principles to
alter that behavior, when desirable).

Several instructional goals are then derived from the
course goal. These instructional goals describe, in
behavioral terms, the skills that the students should be
able to demonstrate at the end of the course. The
instructional goals for our General Psychology course are as
follows.

Given a fixed number of lessons, the faculty must next
decide how many lessons are needed to accomplish each of the
instructional goals. Then, lesson objectives are developed
to support one or more of the instructional goals. Finally,
performance objectives are derived from the lesson
objectives. A performance objective directs the student to
obtain some basic unit of knowledge. Like lesson
objectives, performance objectives are stated in behavioral
terms. Students may, among other things, be directed to
define a term, to describe a theory, or to illustrate a
principle.

Each year, the General Psychology faculty publishes a
course guide that contains administrative instructions, the
course goal, instructional goals, lesson assignments, lesson
objectives, and performance objectives. The definitions of

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the key behavioral terms used in the performance objectives,
are also included. In addition, several supplemental
readings that present necessary material not covered in the
text, are also included, as well as, cartoons, and newspaper
and magazine articles, which relate to particular lesson
content, to stimulate cadet interest and provoke their
thinking. This year's course guide is more than 170 pages
long. Student knowledge is tested by multiple choice
questions derived directly from selected performance
objectives and by essay questions, called integrated
performance objectives (IPOs), which require students to
respond at a higher cognitive level.

Students are to come to class having already mastered
the performance objectives. The instructor's job is to
provide instructional activities which will help the
students integrate various performance objectives, thus,
allowing them to achieve the lesson objective. Great
efforts have been made to design classroom instructional
strategies to help students process course content at this
higher cognitive level. The result is that classroom
instructional strategies generally consist of small group
exercises that provide students opportunities to apply the
knowledge gained from mastering the performance objectives,
present their solutions to their classmates, receive
feedback, and remediate. Often, the practical exercises are
"practice IPOs." That is, the practical exercises are
closely patterned after the essay questions they will

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receive on their exams. There is no time for instructors to present knowledge-level information and "teaching as talking" (Cross, 1986) is discouraged.

Unfortunately, little in the cadets' past academic experience has prepared them to take such an active role in their learning. So initially, students floundered in class and instructors frequently gave into the pressure to revert to being a "talking head." Out-of-class instructional strategies had to be developed to help the cadets to get ready for class. Originally, specifically designed worksheets were created and used with some success to present basic knowledge-level objectives.

Starting in 1986, all incoming cadets were required to purchase Zenith Z-248 (IBM, AT compatible) computers. Subsequently, the West Point faculty was encouraged to explore ways to use the computer in courses taught throughout the academy. The General Psychology faculty decided that they would stop producing the massive numbers of worksheet it was generating and that the computer could be used to help cadets master performance objectives prior to class attendance. Members of the faculty developed a tutorial and issued it to the Class of 1991 in the fall of 1987. The real strength of this tutorial over software aids that are available from textbook publishers is that this tutorial closely parallels the Course Guide developed by the General Psychology faculty.

The tutorial contains exercises for each of the forty lessons in the course. Currently, there are four types of interactive exercises on the tutorial. Matching exercises appear in each lesson. They are designed to help the cadets master new psychological terms. Multiple choice questions also appear in each lesson. They check the cadets' knowledge and understanding of the basic concepts. There is at least one multiple choice question for each performance objective in the course. These questions are similar to the multiple choice questions that cadets will receive on their exams. Therefore, not only do the questions aid in checking the cadet's knowledge prior to class, but they can also be used in preparation for exams. Some tutorial lessons contain special exercises designed to help the cadets master material that has proven over the years to be troublesome. Examples of such material are the logical decision-making model, using the utility and probability model and bottom-up processing, as it pertains to pattern recognition. The final type of exercise on the tutorial is the IPO or essay practice. The integrated performance objective practices are the same as those used in class and very similar to the ones found on the exams. Cadets are referred to their Course Guide to read a situation. Students can select one of several essay-type questions that pertain to the situation. They are then provided with a series of multiple choice questions based on this situation. The nature of these questions, and the sequence in which they are

presented, are aimed at helping the cadets learn the
intellectual procedures necessary for integrating and
applying their knowledge.

In addition to preparation for classroom and exams,
computers are also being used in one of the General ·
Psychology laboratory periods. Two programs were written to
help cadets understand how psychologists conduct research.
Cadets act as subjects and then are "walked through" the
research process. They are prompted by the computer to
determine what type of research is being done and to develop
appropriate hypotheses. They are then shown the data they
have generated, and asked to make decisions on appropriate
descriptive statistics. Finally, the computer provides them
the results of an inferential statistical analysis and the
cadets are then asked to relate the results back to the
original hypothesis. The whole laboratory exercise takes
less than 30 minutes. ("Based on class sizes ranging for
14-18 students) It appears to be very successful in
teaching concepts that have traditionally been difficult for
cadets. As most of you are no doubt aware, there are many
publishers who market similar software packages. Again, the
the advantage of the ones developed by our department , is
that they closely follow the lesson objectives on which the
cadets will eventually be tested.

In an effort to gain some idea of the real impact of
the computerized tutorial on student learning the General
Psychology faculty collected survey data on the tutorial

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three times during the 1987 fall semester. A total of 1178 surveys were collected. Cadets were asked how often they used the tutorial to prepare for class, to review material covered in class, and to study for exams. They were asked to rank the usefulness of the tutorial, the textbook, the course guide and class notes, and classroom discussions and practical exercises. They were also asked to indicate the perceived value of the tutorial in learning psychology; and to indicate how easy the tutorial was to use. Finally, since the surveys were distributed after exams, the students were asked to record their exam scores on the survey.

The data was analyzed both manually and by using descriptive statistics programs found on SPSSPC+. The results indicate that the mean study time for the cadets prior to class is 32.2 minutes. This number is in line with time studies conducted over the past 13 semesters. Their study time is most likely a function of the other courses they have and how they are taught versus the General Psychology is taught and evaluated. Cadets also report that they spend an average of 22.8 minutes reading their textbook, and an average of 14.2 minutes using the tutorial. Seventy-five percent (75%) of the students reported using the tutorial at least occasionally prior to class and 54% of the cadets reported using it at least half the time prior to class. In addition, 65% of the cadets reported using the tutorial after class at least occasionally and 42% used the tutorial after class to review information. Cadets ranked

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the tutorial as the most useful of the four major tools at their disposal to learn psychology. Classroom discussions were next, followed by their class notes and course guide. Interestingly, the textbook was ranked last. Eighty percent (80%) of the cadets said the tutorial was either valuable or extremely valuable, and 93% of the cadets said the tutorial was either easy or extremely easy to use.

A Pearson product-moment correlation coefficient was calculated for exam scores and frequency of tutorial use. The result indicated that there is an essentially orthogonal relationship between these two variables ($r = .07$). In addition, the final grades for all students taking General Psychology in the fall of 1987 were compared to the grades students received in previous fall semesters. There was no difference.

As a result of our data analysis, our observation of student behavior, and our discussions with cadets and instructors, we have learned some valuable lessons. Plebes are not going to spend more than about 30-40 minutes in preparation for a psychology class in spite of an institutional guideline that states cadets should spend 2 hours in preparation for every hour spent in the classroom. (Talk about the courses a Plebe takes, how they are evaluated, what there daily schedule and routine are.) In those 30-40 minutes, it is difficult to read the course guide, study the textbook, and use the tutorial. We believe that many cadets, like other students, develop strategies to

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gain the most knowledge with the least expenditure of time and effort.

Some cadets choose not to use the tutorial at all. For others, the tutorial has replaced the textbook. These cadets are probably learning less psychology than they would without the tutorial. Still other cadets have found that using the tutorial in conjunction with their textbook and course guide allows them to study more efficiently. They are able to gain a greater understanding of the material with the least expenditure of time. Instructors report that it is obvious when cadets have used the tutorial in conjunction with the textbook and the course guide prior to class. These cadets are better prepared for classroom discussions and require minimal preparation time for in-class practical exercises. Unfortunately, there is no indication that using the tutorial has any significant impact on a cadet's test performance.

One possible explanation for why General Psychology grades did not improve after the introduction of the tutorial is because most of the matching, multiple choice, and IPO exercises already existed as paper handouts. The paper versions were handed out as homework, to be completed prior to class and used by instructors as a diagnostic tool at the beginning of class. So the tutorial, in many respects, merely represents a change in medium. There is one difference, however, the tutorial provides the cadets immediate feedback.

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Another possible explanation for why grades have not improved is because the tutorial has not been used properly. The tutorial was originally designed to supplement the textbook, not to replace it. It was designed to check the cadets' understanding of course material already studied by offering matching, multiple choice, or other exercises by covering a representative sample of the material. Not all the required basic knowledge is contained on the disk. If the cadets gave a wrong answer to a question, they should have returned to the textbook to study the material again. If they gave a correct answer it could indicate that they truly understand the theory or principle that underlies the question or that they made a good guess. As a result of all this, the cadets develop a false sense of security ("I got this question right so I really must know this stuff!"). If this is true, then at least for some cadets, the tutorial has become a liability rather than an asset.

Another drawback to the tutorial is the tremendous amount of instructors' time required to create and maintain it. Each year the General Psychology faculty updates the course. Lesson objectives, performance objectives, the course guide, exams, teaching criteria, grading criteria, practical exercises and teaching strategies are all reviewed and modified, if necessary. Any change made to these materials will most likely necessitate a change to the tutorial. While changing tutorial content can be done on a word processor, someone with programming experience is

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needed to insure these changes will not cause any problems in executing the program. We currently have only one faculty member with sufficient programming capability to oversee the tutorial. Since all instructors already carry a full load of teaching, counseling, and other administrative responsibilities, we are not certain that the benefits, if any, gained by the cadets who use the tutorial are worth the cost in terms of time and effort on the part of the faculty.

In spite of the drawbacks, and lack of scientific data to support enhanced outcomes in student learning, the Department of Behavioral Sciences and Leadership is continuing to explore and develop computer assisted instruction. We realize that computer assisted instruction is a new medium for both cadets and instructors; and there is still the belief that, if properly used, the computer can be a useful aid in teaching psychology. As a result, the department has planned several initiatives to enhance its computer assisted instruction capabilities. First, we plan to update the General Psychology tutorial by adding remediation to the tutorial exercises. The remediation will help the cadets understand why their answers were right or wrong by explaining the theory or principle that underlies the question.

Second, we have begun work on a tutorial for the other core course offered by the department, Military Leadership (Leadership in Organizations). This tutorial will incorporate a feature that prints out all responses to

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questions made by a cadet. Instructors will then be able to review these printouts, identify those areas in which the cadets are having difficulty, and then pattern their classroom instruction accordingly.

We also are investigating the use of commercially developed authoring systems. Although these systems are expensive, they would reduce the time it takes to develop and maintain a tutorial, give the faculty the ability to tailor a tutorial to their course, and incorporate more sophisticated graphics and video.

Finally, proposals are being drawn up that will allow actual experimental procedures to be used in the core courses to see if any of various alternative computer assisted teaching method can be demonstrated to enhance student learning.

In the final analysis, the decision to continue computer assisted instruction should be based on whether it significantly improves student learning. But even the best software is not worth the disk it is stored on if it is used improperly or not used at all. It is up to the students to take the initiative to properly and diligently use the learning tools at their disposal and to instructors to continue to design and investigate improved instructional strategies for using them.

Commercial developers of computer assisted instruction claim that, in some instances such as pilot refresher courses and soldier military specialty instruction, they

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have reduced training time by as much as 30%. In our experience, it is too early to say that educational software will have a significant impact on learning, but it is also too soon to say that it won't. If nothing else, our data suggest educators should exercise extreme caution before investing large sums of money in "instructional modernization;" however, it is certainly an area that warrants further investigation.

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