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CREATIVITY TRAINING--A TOOL FOR MOTIVATING DISADVANTAGED STUDENTS.

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AMONG THE COURSES IN THE UPWARD BOUND PROJECT AT THE GENERAL COLLEGE, UNIVERSITY OF MINNESOTA, IS CREATIVE PROBLEM SOLVING. IT IS FELT THAT CREATIVITY TRAINING GIVES THE UNDERACHIEVER THE MOTIVATION AND SKILL TO SOLVE HIS OWN PROBLEMS BY SHOWING HIM THE PROCEDURES OF PROBLEM DEFINITION AND SOLUTION. SIXTY-THREE STUDENTS, OF AVERAGE ABILITY BUT WITH MEAGER CULTURAL BACKGROUNDS, COMPLETED THE 6-WEEK SESSION. THEY WERE CHALLENGED BY SUCH IDEAS AND TASKS AS BECOMING AWARE OF SURROUNDINGS AND EXPERIENCES, NOTING HABITS AND FUNCTIONAL FIXATIONS, FINDING IDEA-SPURRING QUESTIONS, LISTING AND MODIFYING ATTRIBUTES, COMPLETING A "WHAT IF..." SERIES OF SITUATIONS, AND OTHER DEVICES FOR STIMULATING IMAGINATION. THEY ALSO CHOSE PROBLEM PROJECTS THAT THEY COULD PURSUE AFTER THE SESSION. PRE- AND POST-TESTS INDICATED LARGE GAINS IN CREATIVE SKILLS AND SELF-CONCEPTS, AND ALTHOUGH IT IS UNCERTAIN WHETHER THESE WERE ENTIRELY DUE TO THIS PARTICULAR COURSE OR TO THE UPWARD BOUND PROJECT AS A WHOLE, EVIDENCE IS MOUNTING THAT CREATIVITY TRAINING SHOULD BE INCLUDED IN THE SCHOOL CURRICULUM, PARTICULARLY FOR THE SOCIALLY HANDICAPPED. STAFF TRAINING FOR THE SESSION INCLUDED CONSIDERATION OF THE SPECIAL PROBLEMS OF THE DISADVANTAGED, THE PURPOSE OF THE ENTIRE PROJECT AND THE PLACE OF CREATIVITY TRAINING IN IT, CREATIVITY AND ITS FRUSTRATION IN YOUNG PEOPLE, AND THE TEACHER'S ROLE IN DEVELOPING IMAGINATIVE THINKING. THIS DOCUMENT IS VOLUME 4, NUMBER 1 OF "THE GENERAL COLLEGE STUDIES," 1967-68. (HH)

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CREATIVITY TRAINING: A TOOL FOR MOTIVATING DISADVANTAGED STUDENTS

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A liberal admissions policy, its disposition to experiment and to innovate, its emphasis upon excellent teaching, and its flexible, free-choice, two-year curriculum make the General College a useful instrument for the University of Minnesota to use as it seeks to respond to the needs of the educationally, socially, and economically disadvantaged. As a result, the College finds itself involved in a number of community programs. Two years ago, for example, the University asked the College to design, staff, and administer one of the Upward Bound projects to be established in Minnesota. Directed by Professor Jerome E. Gates of our Division of General Arts, Project Upward Bound at the University of Minnesota has earned high praise from students and faculty, and a commendation from the Office of Economic Opportunity for the quality of the program it offers under-achieving high school students of potential college caliber.

The course of study designed for Upward Bound at Minnesota is composed of some of the elements that make the curriculum of the General College unique. In this issue of The General College Studies, Professors Amram and Giese describe how the techniques and concepts of creative problem-solving - with which they had experimented as part of their research in the General College - had immediate and practical application in the curriculum developed for Upward Bound.

Readers of this publication will recall that the research on creativity that forms the basis of the report presented here was originally published in The General College Studies, volume one, numbers 1, 2, and 3. A brief summary of Upward Bound creativity also appeared in the Journal of Creative Behavior I:4:369 (Fall, 1967).

CREATIVITY TRAINING:: A TOOL FOR MOTIVATING DISADVANTAGED STUDENTS

Project Upward Bound was designed to discover and redirect high school students who have college potential but who have been so handicapped by economic, cultural, and educational deprivation that they are unable to use their potential effectively. Upward Bound participants spend a portion of their summer on a college campus engaged in a program of educational, recreational and counseling experiences. The objectives of the program are to offer the participants the opportunity to acquire some academic skills, to provide them with the experience of attending college and living on a college campus, to offer them educational and personal guidance, and to motivate them to succeed. The latter objective is foremost in the minds of those who administer and teach in Upward Bound.

Potential students in the Upward Bound program are identified in their high schools on the basis of their economic and cultural deprivation, their apparent lack of motivation, and their academic abilities. Youngsters selected for Upward Bound probably have a disproportionate share of personal problems. Because these problems are particularly difficult for them to cope with, they generate a kind of discouragement that leads to a negative personal and social outlook so characteristic of a culturally deprived group. Consequently, it seemed desirable to offer the project enrollees some creativity training in the hopes that such exposure would give them some motivation toward solving their own problems, some skills for being able to solve them, and some understanding of problem-solving procedures. The creativity training included in the University of Minnesota Upward Bound program and the related testing program (financed by the Creative Education Foundation) are the topics of this report.

The Minnesota Project

The 1966 University of Minnesota Upward Bound project invited selected students to spend six weeks on the Minneapolis campus. Counselors and staff were recruited from the University of Minnesota, General College and from Minnesota secondary schools. The youngsters lived in University dormitories with University students who served as dorm counselors and recreation leaders. The academic program included course work in communication skills, social studies, science, mathematics, art and sixteen hours of creative training. An extensive recreational-cultural program was available for leisure time activities. After the summer activities on campus, the staff continues its interest in the students by means of a follow-up program, to help the students during the subsequent academic year.

The Student

Sixty-three of the sixty-six high school students who joined the program completed the six-week session. The students ranged in age from fifteen to eighteen years and included 41 boys and 22 girls. Most were C or below average students who ranged in grade level completed from the ninth to the eleventh. Two had dropped out of high school at least once. They represented 42 separate schools from sixteen counties in the state of Minnesota. Table I indicates the family and economic status of participating students. Records of intelligence test scores or scholastic aptitude for many students were not available. In those cases in which such records were available, the results were obtained from instruments so diverse in nature that it was difficult to make a generalization about achievement in relation to native ability. In view of the way participants for the program were chosen, however, it is probably safe to say that most would fall in an ability

range somewhat above average. If this generalization is true, the majority of the students were under achievers, some seriously so.

TABLE I

Family and Economic Status of Participating Students

Status	Number	Percent
10 or more members in family	15	24
7-9 members in family	14	22
Annual family income less than $1,500	3	5
Annual family income between $1,500 and $4,000	28	44
Live on farm	18	29

Creativity Training

Creativity training was employed in the Upward Bound project in two ways. One form involved the project staff in creativity training; the other required students to participate in creative problem-solving classes.

1. Staff Training

   Prior to the opening of the program, staff members were oriented to (1) the problems of the economically and socially handicapped; (2) the problems others have confronted in teaching culturally disadvantaged youngsters; (3) the purposes of the Upward Bound program; and (4) the place and function of creativity training in the program. The creativity sessions were devoted to discussions about (1) creativity in youngsters; (2) frustrations experienced by creative youngsters; (3) teachers responsibility in developing creative behavior; and (4) techniques for

eliciting student creativity. Staff members were also given a preview of what the students would experience in creative problem-solving classes so that they would better understand the content and methodology of a course which was new and strange to most of them. Finally, the staff was taught some of the common idea-finding techniques, such as brainstorming and attribute-listing.

During the orientation period, staff members used the idea-finding techniques to solve problems relating to their specific responsibilities in the project and to help solve project problems submitted by the director. This activity proved to be fun, helpful, and, judging by the number of books and articles borrowed from the instructor's library, stimulating to many members of the Upward Bound Staff.

2. Student Training

The creativity class met in the evening for eight two-hour sessions. Among the topics covered were:

1. Orientation to Creative Problem-Solving: course objectives, value of creative thinking, evidence that creative skills can be improved, meaning of creativity.

2. Sensitivity exercises, becoming sensitive to the environment, awareness of experiences, learning to change role and point of view.

3. Overcoming obstacles to creative thinking: demonstration of habits, conformity, functional fixations, lack of confidence, perceptual blocks, etc. Exercises to help overcome blocks.

4. Overcoming blocks to creativity through audio-visual exercises: "Mobile Reflected Light Images."[1]

5. Idea-finding techniques, principle of deferred judgment, idea-spurring questions, attribute listing, morphological synthesis.

6. Application of total creative problem-solving process to a pre-defined problem situation - sensitivity to problems, types of questions, definition of problem, fact-finding, ideation, evaluation, acceptance-finding.[2]

7. Application of total creative problem-solving process to students' problems.

The following descriptions of some class activities illustrate the methods used to reach course goals. Initial discussion in the creativity series centered on the use of, and need for, creativity in modern society. The catalyst for the discussion was an advertisement projected on a screen from the journal, Successful Farming, dated February, 1912. In the ad R. E. Olds refers to his "farewell car." He says, "I do not believe that a car materially better will ever be built." Although the car was praised by many members of the class, most agreed that improvements have been made in Oldsmobiles and in methods of transportation since 1912. Discussion then centered on accidental insight versus "creativity on purpose." Additional visual aids (puzzles, optical illusions, etc.) were then brought in to illustrate the need for being more observant and more cautious before drawing conclusions.

At one session each student was given a wire coat hanger which was to be shaped into a new object and returned the following day. This exercise was one of several to help break down functional fixation. Several students did not return the coat hangers, but most returned them shaped into a variety of objects. Among the products returned were a monocle, a guillotine, spectacles, a sky hook, a doll's chair, and miscellaneous art objects. Several students had added other materials to the wire such as paper, wood, or razor blades. Those were

used to illustrate the concept of elaboration in creative behavior. One student, who consistently resisted any change in himself and who frequently insisted, "I'm practical and I'm proud of it," brought in his wire coat hanger rolled into a spool and announced, "I'm going to save mine until I need some wire."

Another sample of the many exercises used was "attribute listing." This exercise required the students to list (brainstorm) all the attributed (qualities, characteristics) of a plain screw driver which the instructor held up. Students were encouraged to use all of their senses. At first they only described what they could see. Soon they listed attributes that could be identified through smell, touch, taste, hearing, etc. Enrollees were then asked to modify the screw driver by changing one of its attributes. The exercise was repeated using different kinds of objects and situations.

An exercise designed to stretch imaginations and show man's ability to work in various frames of reference was the "what if..." series of questions. Enrollees were asked to respond to questions such as:

> What would happen if the clouds had strings that reached to the ground? (Suggested by Prof. E. Paul Torrance.)[3]
> What would happen if everyone could read everyone's thoughts?
> What would happen if cows were the size of mice?
> What would happen if you, and only you, were invisible?

A homework assignment related to the "what if..." exercise gave students an opportunity to solve problems by changing objects and situations as though the enrollee were a magician. This assignment (given to the authors by Prof. E. Paul Torrance)[4] was designed to reinforce the imagination stretching exercise.

In all of the exercises, assignments, and problem-solving situations students were encouraged to follow the four brain-storm rules suggested by the late Alex F. Osborn:[5]

1. No criticism of self or others. Defer judgment.
2. Quantity is wanted.
3. Free-wheeling is welcome.
4. Combination and improvement are sought.

The first problem which the enrollees followed from beginning to end was an effort to improve the Upward Bound Project. The students were taught and encouraged to use the steps of creative problem-solving: fact-finding, problem-finding, idea-finding, solution-finding, and acceptance-finding. A fuzzy problem situation was handed to each enrollee:

> 1966 is the first year for Project Upward Bound at the University of Minnesota. Many comments from staff and students have been extremely favorable. However, a variety of problems have come up. One problem is that not all the students have been motivated to capacity. Another problem is that the staff has not met all the personal and educational needs of the students. The staff of Project Upward Bound wants to make the project the best and most successful in the country. HELP!!!

A set of worksheets devised by Dr. Sidney J. Parnes of the State University of New York at Buffalo[6] was distributed to each student. The director of the project attended the session at which fact type questions about the project were asked. This particular session had a unique side effect in that the enrollees discovered at an opportune time certain information which they had not internalized before. For many, the purposes and the organization of the project were placed in focus at this time. The youngsters selected four sub-problems related to Upward Bound on which they planned to work; then they brain-stormed for solutions to these problems. All ideas were

recorded and duplicated; a copy given to each enrollee at the next session.

Each student also had an opportunity to select and work on a problem of his own choosing. Although many of the problems selected were superficial, they did give each student an opportunity to try the creative problem-solving process for himself. Problems included the following: "How might I break the strings between me and my parents?" "How can I cheat more easily?" "How can I go about getting a better girl?" "How can Steve and I be happy together always?"

On the last evening of the program, each enrollee was asked to write a letter to himself which will be sent to him six months from the date the letter was written. The class discussed the fact that many of the students have long-range goals but have no plans for gradual achievement of those goals. The class reviewed earlier discussions about sensitivity to problems and the need to deal with the problems. Each enrollee was asked to write in his letter some goals he intends to achieve during the next six months.[7]

In the hope that creative thinking would continue throughout the follow-up program, each student selected a project on which he would work during the year and which he would present during the following summer when he returns to the University. Class time was used to make the assignment and to help each student brainstorm for possible projects. On the last class day each student made a final project selection and identified an advisor (any member of the Upward Bound staff) with whom he would correspond during the year.

Of course the group engaged in many additional exercises. The above examples are intended only to illustrate the kinds of activities in which the class members participated during the creativity training.

The Testing Program

Two types of tests were used in the testing program. One was a test of creative thinking abilities.[8] The second, a test of self concepts as a problem solver.[9]

1. Creative Thinking Skills Test

The test of creative thinking skills consisted of three tasks. Two tasks were designed to test non-verbal creativity. In these, the subjects were asked to make as many pictures as they could from (1) triangles and (2) circles. One task was designed to measure verbal creativity. In this task, the subjects were asked to list all the uses they could think of for tin cans. In all tasks subjects were encouraged to stretch their imaginations. Each task was timed carefully for ten minutes. The test was given during the first week of the Upward Bound program and again during the last week of the Upward Bound program. Each of the three tasks was scored for fluency (the quantity of relevant ideas), flexibility (the number of different categories or strategies used), and originality (the relative infrequency of each idea among the Upward Bound students). Fifty-seven students completed the pre- andpost-tests.

Table II shows the mean pre- and post-scores, the mean gains, and the t-values in the creative thinking skills tests.

In each case the gains were all significantly beyond the .01 level of confidence.

TABLE II

Non-Verbal Tasks

Task 1		Means			Task 3		Means	
Pre	Post	Gain	t-value		Pre	Post	Gain	t-value
11.2	19.0	7.8	7.7 *	(FLUENCY)	15.2	23.9	8.7	9.8 *
9.4	13.4	4.0	3.8 *	(FLEXIBILITY)	10.7	15.3	4.6	6.7 *
12.4	32.3	19.9	8.0 *	(ORIGINALITY)	17.9	34.6	16.7	8.3 *

*p .01 level of significance

Verbal Tasks

Task 2	Means			
Pre	Post	Gain	t-value	
17.5	34.2	16.7	13.7 *	(FLUENCY)
10.5	14.9	4.4	4.6 *	(FLEXIBILITY)
18.1	49.4	31.3	8.3 *	(ORIGINALITY)

* p .01 level of significance

Since there were no control groups in this study, an obvious question is raised. Are the gains due to a test-retest effect, or are they a reflection of real growth in creative skills? Because of the unusual composition and living conditions of the group under investigation, it was impossible either to find a comparable group to serve as a control or to administer randomly the course to half the students. Such controlled experiments have been conducted by the authors using

a population of junior college students. The conclusion of these investigations was that control groups do not normally increase scores significantly from pre-test to post-test. Table III shows the results of pre- and post-test scores on the tin can task (Task 2 in Table II) administered during the spring quarter, 1963, to General College students ten weeks (one academic quarter) apart. The experimental group with gains similar to those on the Upward Bound tests was a Creative Problem-Solving class. The control groups were beginning speech classes taught by two different instructors.[10]

2. Test of Self-Concept as a Problem Solver

A second test administered to the Upward Bound students was a test of self-concepts as a problem solver. In this case, the subjects are challenged to think about how they would run a heavy television cable through a twisting pipe below the ground. The subject responds "yes" or "no" to a series of 52 questions which, in this case, were read aloud to the subjects. A few examples of the questions will give an idea of the nature of the test.

1. A problem like this one is probably too hard for anyone like you to solve.
6. Ideas that are wrong don't need to be suggested, because they only waste time.
25. Some people are naturally born to be better thinkers than others, and there is nothing that can be done.
39. Do you think that ideas given by other students for solving this problem would be better than your ideas?

The test was administered during the first and last weeks of the program and scored for appropriate answers. A significant gain in score should imply a more favorable self-concept as a problem solver. Mean gains for boys (N=38) was 4.0 and for

girls (N=21) was 4.6. Both gains were significant at beyond the .01 level of confidence.

TABLE III

Verbal Task Means

Fluency	Pre	Post	Gain
Experimental Group	17.6	34.8	17.2
Control Group 1	15.6	18.8	3.2
Control Group 2	14.4	16.6	2.2
Flexibility			
Experimental Group	9.0	13.9	4.9
Control Group 1	6.6	9.1	2.5
Control Group 2	8.5	8.6	.1
Originality			
Experimental Group	14.8	34.8	20.0
Control Group 1	10.8	15.3	4.5
Control Group 2	9.6	10.4	.8

In this case also, the problem of inadequate control groups existed. Table IV has been included to indicate that other groups normally do not show large increases. The table shows the mean gains for college students enrolled in a creative problem-solving class and in three control classes tested during the fall quarter of 1965. The control classes consisted of two retailing classes and one writing class.[11]

TABLE IV

Mean Gains

Experimental Group	Control Group 1	Control Group 2	Control Group 3
4.7	- 1.0	1.7	1.4

Summary of results

The tests given to our Upward Bound students indicate large gains on both the test of creative skills and on the test of self-concepts as a problem-solver. There is no way to determine how much of this gain was a result of the Upward Bound program in general or how much of the gain is attributable to the creative problem-solving sessions. Perhaps future testing in other Upward Bound programs can shed further light on this question.

At first the reaction to the course by most students was one of resistance. After the post-tests were administered, however, many students came to the instructor and to the project director to say, in effect, "Something did happen to me after all."

Several weeks after the students went home, the instructor of the creative problem-solving course received a letter which began, "Surprisingly enough your creative problem-solving class has helped me solve a serious (to me) problem." It may be a surprise to this youngster, but to those of us who have been involved in the Creative Education Movement the surprise is wearing off. Evidence is rapidly mounting that creativity training should be included in the school curriculum. It may, infact, be vitally necessary in the education of the socially handicapped.

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9. This test was devised under the direction of Dr. Martin Covington and Dr. Richard Crutchfield, University of California, Berkeley, and used with their permission.

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