The evaluation plan is also thorough. Rather than presenting a superficial or simple evaluative plan, common in many proposals, Dr. Massaro offers a true cause and effect analysis. It is clear what the students will be doing and how their instruction will be evaluated.

Dr. Massaro's successful proposal follows.

INSTRUCTIONAL LABORATORY IN EXPERIMENTAL PSYCHOLOGY

by Dr. Dominic Massaro

A. NEED FOR THE PROJECT

The goal of this project is to improve the capability of the University of California at Santa Cruz for educational training in scientific inquiry in psychology. The project will help fulfill the nation's need for skilled experimental psychologists in addition to developing a citizenry literate in the methods of inquiry in experimental psychology.

1. Applicant Institution

Santa Cruz is one of the nine campuses that comprise the University of California system. The Santa Cruz campus emphasizes high quality undergraduate instruction in a wide range of traditional and interdisciplinary majors. UC Santa Cruz was founded with a spirit of experimentation which led to the development of a number of unique programs including the Narrative Evaluation System (NES) in which the student's performance is evaluated by written descriptions rather than by letter grades; an independent study program which permits the student to pursue an area of particular interest beyond the limits that a regular course will allow; and the university's Field Study Program which allows a student to gain practical experience from exposure to the workaday "real world."

2. Problem Statement

The problem to be addressed by this proposal is the inadequate undergraduate educational training in experimental psychology. The university's Psychology Board of Studies has concentrated on teaching nonexperimental approaches to psychological study, focusing on courses in social/personality, humanistic, and community psychology. Given the acknowledged excellence of the teaching and training in these nonexperimental areas, we have the unique possibility of complementing this training with comparable training in experimental psychology. Scientific inquiry is a particularly important dimension in psychological training, since social science students generally take a limited number of courses in science.

This project will focus on the improvement of the undergraduate training in experimental psychology. Currently, experimental psychology is taught to relatively large classes of about 100 students with minimal laboratory participation. In addition, there are only limited facilities available for experimental laboratories and independent student research. This is an important problem because of the limited opportunities for undergraduates to gain an understanding of the value of experimental approaches to psychological inquiry. Science is vulnerable to attack by those unfamiliar with its philosophy, methods, and goals. Social science is particularly vulnerable. In this regard, it is important for students to become familiar with the scientific dimensions of psychology. The goal is to provide students the opportunity to learn the methods of

Dr. Dominic Massaro is Professor of Psychology at the University of California at Santa Cruz. He has numerous publications in the areas of discriminant learning, memory, visual illusions, auditory information processing, empirical instrumentation, shape perception, and speed perception.

investigation and evaluation in psychological science.

The learning process ideal for this goal is to allow students to experience for themselves the experimental method and the phenomena that are observed. The learning environment will enable students to participate in actual experimentation. This experience will facilitate the literacy of our students with regard to psychological experimentation. The object of the laboratory will allow demonstration of many of the known phenomena in psychology and will enable students to experience directly the methods of observation and experiment. This training will provide the background for advanced and original work by the students. The outcome will not only provide students with a better understanding of psychological research, it will stimulate and encourage students to participate in the research process by pursuing careers in psychology.

3. Proposed Activity

The project is to develop a computer-controlled research laboratory dedicated to undergraduate education. We plan to take advantage of the advanced state of the art in the development of the laboratory. Many of the features of professional research laboratories will be incorporated into the facilities. Existing computer programs will be adapted for use. In addition, commercially available programs have been purchased and will be implemented.

B. PROJECT OBJECTIVES

The objectives are (1) to allow every student in psychology to participate in the process of scientific inquiry, (2) to overcome any negative attitudes students might have with respect to scientific endeavor in psychology, and (3) to allow students to gain the qualifications to pursue independent research.

One of the goals of an experimental laboratory is to teach the appropriate methods for psychological inquiry. The irony is that it may not be possible to teach this kind of knowledge if it is truly tacit knowledge (Weimer, 1979)[1]. Tacit knowledge is information not directly available to conscious awareness and not capable of being directly communicated. In this regard, scientific methodology can be considered to be analogous to other skills such as riding a bicycle or playing good tennis. Instructors insist that these skills cannot be taught explicitly. The coach teaches by example and the student must learn by observing and doing. Similarly, we will ask the student to learn from examples of scientific practice in the laboratory. There is no explicit set of rules for doing science, only examples of good, mediocre, and poor research enterprises. The perceptive student will learn the rules of the science game by observing, participating, and practicing.

The laboratory exercises will introduce students to the important dimensions of experimental psychology by direct experience. The theme of the training process is that the research process is best learned by direct participation. Students will be able to experience many of the psychological phenomena in the laboratory. In addition, they will become directly involved in the important features of experimental control, observation, measurement, data analysis, hypothesis testing, and scientific communication.

The experimental exercises will be tailored as much as possible to the individual student. Each exercise will be adapted to the current performance of the student. Students will bring to the laboratory different levels of preparation, different learning rates, and unique sensory, perceptual, and cognitive capacities. The exercises will be presented in a format to allow for these individual differences. Before a given exercise is initiated, the student will be questioned about the purpose and methods of the exercise. If these are not known, the student will participate in a short learning module addressing the exercise under study. After completing the background exercise, the student will participate as both experimenter and subject in the experiment. As experimenter, the student will interact with the computer to (1) determine the appropriate design and method of

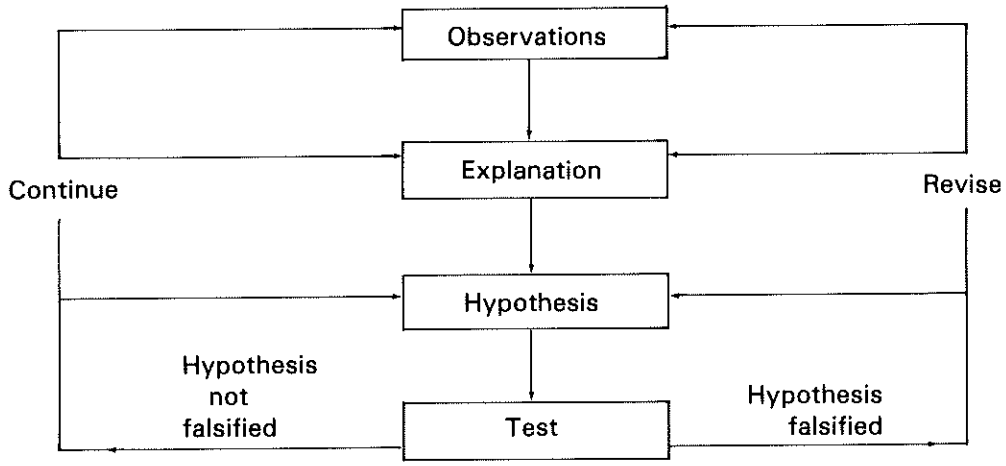

Fig. 1. Ideal Model of the Scientific Process.

study, (2) specify the independent and dependent variables, and (3) illustrate the appropriate instructions for the task. The experiment itself will allow the task to be continuously modified to adjust to the performance of the student. If the task is too difficult, it will be made easier; if it is too easy, it will be made more difficult. This adaptation procedure is critical to the experience of many psychological phenomena.

The actual laboratory exercises will not only illustrate psychological phenomena but will also attend to the critical features of scientific inquiry. As an example, studies of the subjectivity of scientists and the contribution of a confirmation bias will be included in the exercises. The exercises will be conducted within the larger framework of scientific inquiry. Initially, the students will learn about the nature of scientific inquiry. Scientific frameworks for hypothesis testing will be studied and evaluated. The role of falsification and the nature of verification will be presented in the context of psychological experimentation. Exercises will be developed to show that falsification and verification do not have a symmetrical relationship as many students first believe.

The sequence of events in scientific endeavor (as illustrated in Fig. 1) gives the framework for the laboratory exercises. Students will learn where hypotheses come from, how they are formalized for experimental test, how they are tested, and how tests lead to modification of the explanatory concepts. Popper's (1959)[2] falsification strategy and Platt's (1964)[3] strong inference strategy will be illustrated in experimental situations. The use of analogy in explanation will also be demonstrated. As an example, symbolic computing devices might serve as a model for certain aspects of the mental functioning of humans. In one laboratory exercise, computer programs will be developed to carry out specific types of memory search and experiments will be carried out to test if they describe how humans perform memory search. This and other exercises will teach students how analogies can be developed into specific models, and how these can be tested directly in psychological experimentation.

A few laboratory exercises will be aimed at the study of confirmation bias in the evaluation of scientific evidence. Students will observe that participants will usually give more weight to positive than to negative evidence. Modifications and extensions of the experiments by Wason and Johnson-Laird (1972),[4] Mynatt, Doherty, and Tweney (1977),[5] and Rips and Marcus (1977)[6] will be used as laboratory demonstrations and experiments. These exercises will facilitate the student's understanding of how confirmation bias plays a role in scientific endeavor and how research strategies can be developed to overcome this bias.

Measurement is one of the keystones of scientific endeavor. Some of the laboratory exercises will

allow the student to learn the concepts underlying measurement and the techniques for implementation. Some of the training will take place in the context of psychophysics, the relationship between mental and physical phenomena. Students will learn the procedures of psychophysical tasks within the context of specific models of psychophysical phenomena. The concept of a threshold will be explored followed by the idea of continuous sensory information. The important role of decision processes in psychophysical tasks will be illustrated and related to decision making in scientific endeavor. The dice game (Massaro, 1975)[7] will be implemented as an experimental study of decision processes. Some experiments in this domain will be formalized in the framework of applied situations, such as the detection of a malignant growth in X-ray photographs.

The use of reaction times to study mental phenomena will be the theme of another laboratory exercise. Donders' (1969)[8] subtractive method and Sternberg's (1969)[9] additive-factor method will be taught and implemented in various ways. The limitation of the subtractive method will be illustrated, followed by the improvements given by the additive-factor method. The analysis and interpretation of experimental results will be an important feature of this exercise. For advanced exercises, students will be able to explore advanced techniques such as speed-accuracy functions (Pachella, 1974; Reed, 1976; Wickelgren, 1977)[10,11,12] and Cascade models (McClelland, 1979).[13]

Other experimental exercises will be developed in the context of substantive areas of psychological endeavor. Memory tasks will be used to illustrate the study of the representation of information and the retrieval of this knowledge in cognitive functioning. As an example, the role of category knowledge in memory storage and search will be illustrated in recall and memory search tasks. Language processing will be studied in the context of speech perception, reading, and psycholinguistic experiments. Imagery and spatial learning will be the topic of another set of laboratory exercises. Students will have the option of selecting exercises in their areas of interest for some of their projects in their undergraduate training.

One anticipated result will be an increased awareness and appreciation of scientific endeavor in psychological inquiry. One common experience faced by all psychologists is that nonpsychologists have very little understanding of the research domain in psychology. Students arrive without a knowledge of experimental methods and how these methods can be adapted to the study of psychological functioning. The experiences in the experimental laboratory will educate students and advance their knowledge of scientific psychology.

A second result will be students who are better prepared to pursue careers in professional psychology. The experience should encourage students to pursue experimental psychology as a professional endeavor. This outcome might be particularly relevant to minority students and women, since without the experience, they would have been less likely to consider experimental psychology as an option. The 1979 Summary Report of Doctoral Recipients issued by the National Research Council states that 293 doctoral degrees were awarded in the field of experimental psychology by U. S. universities. Eighty-two of the recipients were women and 10 recipients were known minorities.

C. PROJECT DESIGN

The project will be organized and managed by Dr. Dominic W. Massaro. Dr. Kristina Hooper and Dr. Melanie Mayer will be consultants on the project. The first year will be directed at the building of the laboratory and the development of the computer programs. Dr. Massaro will develop the plans for the laboratory and will design the exercises and experiments. Faculty and students will be consulted for evaluating existing ideas and for generating new ones. The electronics technician will be responsible for interfacing the equipment to the computer. The computer programmer will

be responsible for developing the computer programs to present the laboratory exercises and experiments. Both of these people will be responsible to Dr. Massaro.

During the first year of this project, specific exercises will be tested as pilot projects in the experimental course and other courses. In the second year, the exercises will be implemented and evaluated in the experimental course. The course will be taught three times by different professors (tentatively, Massaro, Hooper, and Mayer).

D. INSTITUTIONAL COMMITMENT

The value of the proposed project to the Santa Cruz campus can be readily demonstrated by reviewing the campus commitment of resources to its development. The University allocated a large laboratory space, renovated the space to hold research equipment and laboratory testing stations, and has purchased a large computer and a range of laboratory equipment such as computer terminals, visual display devices, tone generators, etc. The estimated value of the equipment and renovation work is approximately $130,000. The Principal Investigator has been granted a one-course reduction in his regularly scheduled teaching responsibilities to enable him to commit the necessary time to insure the project's completion on a timely basis. The University of California has a tradition of support for excellence and innovation in teaching. The primary source of support for these efforts has been from the campus' Task Force for Instructional Improvement, a fund provided by the University's Systemwide Administration and specifically designated toward instructional improvement activities. In support of this project, the Task Force allocated $10,000 for the experimental psychology teaching laboratory technician's recharge costs. We are applying this support toward the grant's matching requirements.

E. POTENTIAL IMPACT

The programs and materials to be developed were discussed in Section B, Project Objectives. These materials will be made available to succeeding courses in experimental psychology and for use in independent student projects. In addition, the programs will be available to other

Detailed Matching Funds Budget

Matching funds will be provided by the University of California, Santa Cruz as noted. These funds will be available and expended during the period of the proposed project, September 1, 1981 through February 28, 1983.

$10,000	An instructional improvement grant to support recharge costs of a laboratory technician to be assigned to the Experimental Psychology Teaching Laboratory
1,500	An allocation of research funds by the University's Chancellor in support of the experimental psychology laboratory
$11,500	Subtotal
3,933	34.2% Indirect Costs, on-campus educational services rate, modified total direct costs
$15,433	Total Matching Costs

educational institutions, if they wish to develop similar laboratories. Making the modules available will foster communication among colleges and will lead to substantial improvement in the programs and their implication.

F. EVALUATION PLAN

The evaluation of the laboratory exercises will involve the following procedure. As noted in Project Objectives, a series of laboratory exercises and experiments will be developed. These can be considered to represent separate learning modules covering the content of the experimental course. Only some of the learning modules will be implemented in each course to evaluate the contribution made by each module. Given six learning modules and three courses, four learning modules will be implemented in each course as illustrated in Table I. Extra lecture time will be devoted to the two topics not covered by the learning modules. This will allow both a within-course, across-module and a between-course, within-module evaluation. As an example, mastery of the concepts of A, B, C, and D can be compared to mastery of E and F for Course 1. Additionally, mastery of E and F for Course 1 can be compared to mastery of these modules for Courses 2 and 3.

Table I. Evaluation of Learning Modules

Learning:	Modules	Tests
Course 1	A B C D	A B C D E F
Course 2	A B E F	A B C D E F
Course 3	C D E F	A B C D E F

Comparisons:	Within course
Course 1	A B C D vs. E F
Course 2	A B E F vs. C D
Course 3	C D E F vs. A B

Comparisons:	Between course
A B	Courses 1 and 2 vs. 3
C D	Courses 1 and 3 vs. 2
E F	Courses 2 and 3 vs. 1

Similarly, mastery of A and B for Courses 1 and 2 can be compared to Course 3 and so on. In addition to the mastery evaluation, students and faculty will be asked to write narrative evaluations of the laboratory experience. The results will provide information about the effectiveness of the laboratory approach and will allow specific feedback concerning each of the learning modules.

G. PERSONNEL

The Principal Investigator, Dominic Massaro, is a Professor of Psychology, UC Santa Cruz. Dr. Massaro has had 10 years' experience teaching experimental psychology. He has written a textbook, *Experimental Psychology and Information Processing* (1975) which is highly regarded by students and teachers.

Dr. Massaro is the recipient of an intramural grant from the university's Task Force for Instructional Improvement. As previously noted, these funds support the recharge costs for a laboratory technician. The funds were awarded by the Task Force in recognition of a project which promised the improvement of undergraduate instruction. Dr. Massaro's time commitment to the direction of this project and the overall development and administration of the experimental teaching laboratory is supported by a course reduction in his teaching obligations.

Professor Massaro is also the Principal Investigator for an NIMH research grant entitled "Perceptual Processing and Memory of Auditory Stimuli." This grant requires a time commitment of two months during the summer of 1981. The total project period is June 1, 1980 through May 31, 1983.

Dr. Melanie Mayer and Dr. Kristina Hooper are faculty members of UC Santa Cruz's Psychology Board of Studies. Drs. Mayer and Hooper will serve as consultants to this project and are tentatively scheduled to teach the experimental course during the project. A curriculum vitae for Drs. Mayer and Hooper is attached as Appendix A.

(SEE INSTRUCTIONS ON REVERSE BEFORE COMPLETING)

SUMMARY PROPOSAL BUDGET

APPENDIX 2

9-1-81 - 2-28-83

ORGANIZATION: The Regents of the University of California
University of California, Santa Cruz, Santa Cruz, CA 95064

PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR: Dr. Dominic Massaro

FOR NSF USE ONLY
PROPOSAL NO.
DURATION (MONTHS): Proposed / Granted
AWARD NO.

A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title; A.6. show number in brackets)	NSF FUNDED PERSON-MOS. CAL	ACAD	SUMR	FUNDS REQUESTED BY PROPOSER	FUNDS GRANTED BY NSF (IF DIFFERENT)
1. Dr. Dominic Massaro			1	$ 4,971	$
2.					
3.					
4.					
5. ( ) OTHERS (LIST INDIVIDUALLY ON BUDGET EXPLANATION PAGE)					
6. (1) TOTAL SENIOR PERSONNEL (1-5)			1	4,971	
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)					
1. ( ) POST DOCTORAL ASSOCIATES					
2. (1) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	6.2			13,112	
3. ( ) GRADUATE STUDENTS					
4. ( ) UNDERGRADUATE STUDENTS					
5. ( ) SECRETARIAL-CLERICAL					
6. ( ) OTHER					
TOTAL SALARIES AND WAGES (A+B)				18,083	
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				4,004	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A+B+C)				22,087	
D. PERMANENT EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $1,000; ITEMS OVER $10,000 REQUIRE CERTIFICATION)					
TOTAL PERMANENT EQUIPMENT				0	
E. TRAVEL 1. DOMESTIC (INCL. CANADA AND U.S. POSSESSIONS)				0	
2. FOREIGN				0	
F. PARTICIPANT SUPPORT COSTS					
1. STIPENDS $					
2. TRAVEL					
3. SUBSISTENCE					
4. OTHER					
TOTAL PARTICIPANT COSTS				0	
G. OTHER DIRECT COSTS				0	
1. MATERIALS AND SUPPLIES					
2. PUBLICATION COSTS/PAGE CHARGES					
3. CONSULTANT SERVICES					
4. COMPUTER (ADPE) SERVICES					
5. SUBCONTRACTS					
6. OTHER					
TOTAL OTHER DIRECT COSTS				0	
H. TOTAL DIRECT COSTS (A THROUGH G)				22,087	
I. INDIRECT COSTS (SPECIFY) On-campus educational services rate, 34.2% of modified total direct costs				7,554	
TOTAL INDIRECT COSTS					
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)				29,641	
K. RESIDUAL FUNDS (IF FOR FURTHER SUPPORT OF CURRENT PROJECTS GPM 252 AND 253)				0	
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)				$ 29,641	$

PI/PD TYPED NAME & SIGNATURE* — DATE

INST. REP. TYPED NAME & SIGNATURE* — DATE

FOR NSF USE ONLY
INDIRECT COST RATE VERIFICATION
Date Checked | Date of Rate Sheet | Initials - DGC / Program

NSF Form 1030 (10-80) *Supersedes All Previous Editions*

*SIGNATURES REQUIRED ONLY FOR REVISED BUDGET (GPM 233)

Fig. 2. Local Course Improvement Program Cover Page.

LOCI **APPENDIX 3**

PROPOSAL TO THE NATIONAL SCIENCE FOUNDATION

Cover Page

FOR CONSIDERATION BY NSF ORGANIZATIONAL UNIT (Indicate the most specific unit known, i.e. program, division, etc.) LOCAL COURSE IMPROVEMENT PROGRAM	ARE ANY FUNDS IN THIS PROPOSAL BEING REQUESTED ELSEWHERE IN NSF OR IN ANOTHER FEDERAL AGENCY YES ☐ NO ☐ IF YES, EXPLAIN ON BACK.
PROGRAM ANNOUNCEMENT/SOLICITATION NO.: SE 81-34	CLOSING DATE FEBRUARY 15, 1981
NAME OF SUBMITTING ORGANIZATION TO WHICH AWARD SHOULD BE MADE (INCLUDE BRANCH/CAMPUS/OTHER COMPONENT(S) The Regents of the University of California University of California, Santa Cruz	
ADDRESS OF ORGANIZATION (INCLUDE ZIP CODE) Santa Cruz, California 95064	I. R. S. No. 1-94-1539563-A1 16th Congressional District
TITLE OF PROPOSED PROJECT Instructional Laboratory in Experimental Psychology	

$ REQUESTED FROM NSF	$ LOCAL CONTRIBUTION	$ TOTAL PROJECT COSTS
$ 29,641	$ 15,433	$ 45,074

PROPOSED DURATION	DESIRED STARTING DATE
18 months	September 1, 1981

PI/PD NAME AND SOCIAL SECURITY NO. (SSN)*	PI/PD PHONE NO.
Dr. Dominic Massaro 283-36-3398	OFFICE: (408) 429-4272 HOME: (408) 429-5300

PI/PD DEPARTMENT	PI/PD ORGANIZATION
Psychology Board of Studies	UC Santa Cruz

ADDITIONAL PI/PD AND SSN*	ADDITIONAL PI/PD AND SSN*
--	
ADDITIONAL PI/PD AND SSN*	ADDITIONAL PI/PD AND SSN*

*Submission of social security numbers is voluntary and will not affect the organization's eligibility for an award. However, they are an integral part of the NSF information system and assist in processing the proposal. SSN solicited under NSF Act of 1950, as amended.

PRINCIPAL INVESTIGATOR/ PROJECT DIRECTOR	AUTHORIZED ORGANIZATION REP.	CO. PI/PD OR OTHER ENDORSEMENT (optional)
NAME (Prof., Dr., Mr., Ms.) Dr. Dominic Massaro	NAME (Prof., Dr., Mr., Ms.) Dr. Robert F. Adams	NAME (Prof., Dr., Mr., Ms.) Dr. David Marlowe
SIGNATURE Dominic Massaro	SIGNATURE Robert F. Adams	SIGNATURE D. Marlowe
TITLE Professor of Psychology	TITLE Dean, Div. of Social Sciences	TITLE Chairperson, Psychology Board of Studies
DATE Feb 10, 1981	DATE 2-10-81	DATE 2/10/81
TEL. NO. (408) 429-4272	TEL. NO. (408) 429-2911	TEL. NO. (408) 429-2356

Fig. 3. Summary Form for Local Course Improvement Program.

APPENDIX 4

NATIONAL SCIENCE FOUNDATION

Directorate for Science Education

LOCAL COURSE IMPROVEMENT PROJECT SUMMARY FORM

1. NAME OF INSTITUTION (INCLUDE BRANCH/CAMPUS AND SCHOOL OR DIVISION)	2. ADDRESS OF INSTITUTION (INCLUDE DEPARTMENT)
The Regents of the University of California University of California, Santa Cruz	University of California, Santa Cruz Psychology Board of Studies 1156 High Street Santa Cruz, CA 95064
3. PRINCIPAL INVESTIGATOR Dr. Dominic W. Massaro	4. MAJOR DISCIPLINE CODE PS 5. FIELD OF SCIENCE AND ENGINEERING CODE(S) YC 71

6. THIS PROJECT IS PRINCIPALLY AIMED AT STUDENTS EXPECTED TO PURSUE CAREERS:
[X] A. AS SCIENTISTS [ ] B. AS PRE-COLLEGE SCIENCE TEACHERS [ ] C. IN FIELDS NOT DIRECTLY SCIENCE RELATED

7. HIGHEST DEGREE OFFERED IN SCIENCE BY ANY DEPARTMENT ON THE CAMPUS SUBMITTING THIS PROPOSAL.
CHECK ONE: [ ] ASSOCIATE [ ] BACCALAUREATE [ ] MASTER [X] DOCTOR [ ] OTHER (SPECIFY)

8. TYPE OF INSTITUTION [X] PUBLIC [ ] PRIVATE [ ] CONSORTIUM

9. TITLE OF PROJECT
Instructional Laboratory in Experimental Psychology

10. SUMMARY OF PROPOSED WORK

The goal of this project is to improve the capability of the University of California at Santa Cruz for educational training in scientific inquiry in psychology. The project will focus on the improvement of the undergraduate training in experimental psychology. A computer-controlled research laboratory will be developed and dedicated to undergraduate education. Features of professional research laboratories will be incorporated into the facilities. Learning modules and experimental exercises will be tailored as much as possible to the individual student. Students will become directly involved in the important features of experimental control, observation, measurement, hypothesis-testing, and scientific communication. Evaluation of the project will provide information on the effectiveness of the laboratory approach. the specific learning modules, and the laboratory exercises. The anticipated outcome will be an increased awareness and appreciation of scientific endeavor in psychological inquiry. The project will help fulfill the nation's need for skilled experimental psychogists and help create a citizenry literate in the methods of inquiry in experimental psychology.

NSF FORM 4 (Modified)

11. INSTITUTION'S OPENING FTE UNDERGRADUATE FALL ENROLLMENT AS REPORTED IN FALL ENROLLMENT IN HIGHER EDUCATION 1977, NATIONAL CENTER FOR EDUCATION STATISTICS, NCES # 78-312 5,341.

12. NUMBER OF STUDENTS TO BE AFFECTED BY THE PROJECT OVER A 5-YEAR PERIOD 1,160.

13. FROM 12, ESTIMATE THE NUMBER:

A. TO TERMINATE SCIENTIFIC STUDIES WITH THE ASSOCIATE DEGREE 10.

B. TO TERMINATE SCIENTIFIC STUDIES WITH THE BACCALAUREATE DEGREE 1,000.

C. TO CONTINUE SCIENTIFIC STUDIES BEYOND THE BACCALAUREATE DEGREE 50.

D. TO ENTER SCIENCE TEACHING CAREERS AT THE JUNIOR 50 OR SENIOR 50 HIGH SCHOOL LEVEL.

Fig. 4. National Science Foundation Proposal Budget Summary Form.

Concurrent submission of the proposed project to the NSF Instructional Scientific Equipment program is under consideration.

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