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The purpose of the workshop was to involve 30 vocational and technical teachers, supervisors, and administrators from eight states in activities to stimulate and enhance research activities. Presentations and handouts included: (1) "Vocational Education in the Decade Ahead--With Research Implications" by Ray E. Jongeward, (2) "Guidelines for the Division of Adult and Vocational Research," (3) "Economic Issues in the Planning of Vocational and Technical Education" by Robert Campbell, (4) "Resource Materials for Use in Vocational and Technical Education Research," by Kent Wood, (5) "Sampling Methods" by Donald V. Sisson, (6) "Social Dynamite in Our Large Cities" by James B. Conant, (7) "Writing the Research Report," (8) "Educational Research Information Center" by Sandra Noall, (9) "Implementing Research Findings" by Austin G. Loveless, and (10) Stimulating Staff to do Research in Vocational and Technical Education. Also included is the evaluation form completed by the participants. (EM)

MOUNTAIN STATES REGIONAL WORKSHOP

ON RESEARCH IN VOCATIONAL AND TECHNICAL EDUCATION

JUNE 13 - 24, 1966

REPORT ON RESEARCH TRAINING PROGRAM

Sponsored By:

Utah State Board of Education
Research Coordinating Unit

and

Utah State University

Report Submitted:
July 27, 1966
Dr. Carl R. Bartel
Workshop Director

MOUNTAIN STATES REGIONAL WORKSHOP

ON RESEARCH IN VOCATIONAL AND TECHNICAL EDUCATION,

JUNE 13 - 24, 1966

REPORT ON RESEARCH TRAINING PROGRAM

Sponsored By:

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BACKGROUND

The proposal for the Mountain States Regional Workshop on Research in Vocational and Technical Education was submitted January 20, 1966. The project, as approved at a later date, was somewhat different than the initial proposal.

The Research Training proposal was initiated by Mr. Mark Nichols, Administrator, Division of Vocational and Technical Education and Austin G. Loveless, Associate Director, Research Coordinating Unit. It was submitted by T. H. Bell, State Superintendent of Public Instruction, Salt Lake City, Utah.

Final approval of the project by telephone was received several weeks before the actual beginning of the two week workshop. However, formal written approval was not received until during the first week of the workshop.

The lateness of approval prevented adequate announcement and news media presentations by the Director of the Workshop.

Purpose of the Regional Research Workshop

It was the purpose of the workshop to bring to the campus of Utah State University, thirty vocational and technical teachers, supervisors, and administrators engaged in research in Vocational and Technical Education, and Vocational Guidance from the Intermountain region, for a two week workshop to further stimulate and enhance research activities.

Some of the specific objectives of the workshop were as follows:

1. Review and chart research techniques of the participants in the field of Vocational and Technical Education.

2. Provide an opportunity for the participants to engage in the design of a research project.

3. Develop both critical consumers of research and producers of research.

Preparation for the Workshop

As soon as we were informed that the approval of the workshop was forthcoming, plans were developed to conduct the workshop.

After the names of possible participants were recieved, an initial mailing was made. This mailing was concerned with obtaining an indication of interest by possible participants in attending the workshop. A tentative program schedule was also enclosed. Due to the fact that some of those contacted had already made prior committments, additional names were obtained by contacting either the RCU Directors or the State Superintendents.

A second mailing was sent out the first part of June in which specific information concerning the workshop was included. Information concerning Utah State University was also included in this mailing.

During this period of time, in preparing for the workshop, the Director and members of the Research Coordinating Unit kept in close contact to be sure that the details would be taken care of. Correspondence with consultants, the making of facility arrangements, etc. were all firmed up prior to the beginning day of the workshop.

Selection of Research Participants

Each of the Research Coordinating Unit Directors, or in those states which did not have Research Coordinating Units, State Superintendents, for the Intermountain States involved were requested to submit names of possible participants. The number of names each Research Coordinating Unit Director or Superintendent submitted was based upon the population of the State.

The respective states were requested to submit the following number of names plus at least one laternate:

Arizona	6
Idaho	3
Montana	3
Colorado	8
New Mexico	4
Utah	4
Nevada	1
Wyoming	1
Total	30

In general, we found that the states cooperated very well in submitting names and working with the Director in identifying those people who could profit most from such a training program.

Facilities

The necessary classrooms, work rooms and lab areas were made available by Utah State University for use in this workshop. No charge for facilities, by the University, was made to the state for conducting the workshop. Participants were housed in motel facilities which had been identified earlier for this specific purpose. The cafeteria area, as well as the

cafes located in the area were used by participants for meals.

Consultants

Consultants for the workshop were identified by the Utah Research Coordinating Unit Director, Dr. Norman Hyatt. Again, because of the lateness of the project, several changes had to be made as a definite contract could not be entered into until the very last minute. However, it was felt that those who were finally selected did an excellent job of presenting materials to the Workshop participants.

Most of the consultants who made major presentations supplied the Director with copies of their presentations which were duplicated and are included in this report.

EVALUATION OF THE REGIONAL RESEARCH WORKSHOP

Purpose of the Evaluation

The purpose of the evaluation was to obtain the thinking by the workshop participants as to the value they felt they derived through their attendance. Results of the evaluation might also be useful in planning future workshops of a similar nature in this geographical area.

The Evaluation Instrument

The evaluation instrument which was used on the last day of the workshop and completed by the participants follows:

WORKSHOP EVALUATION

The purpose of this questionnaire is to obtain your thinking about the workshop in which you have been participating. Your answers will be helpful in determining the effectiveness of this conference and in the future planning of similar workshops.

The form is designed to help you record your opinions quickly and easily. There are separate instructions for each part of the questionnaire. Read these instructions carefully before answering the questions. Please answer all statements.

There are no "right" or "wrong" answers. You may be completely frank in your replies. Do not sign your name.

PART I

Directions

Read each statement carefully and decide how you feel about it. You will agree with some statements and disagree with others. You are offered five possible answers to each statement. The "undecided" answer should be circled only when you have no opinion. Circle one number following each statement. Please answer all statements.

Example:

	Strongly Agree	Agree	Un-decided	Dis-agree	Strongly Disagree
The city needs to improve garbage collection schedules	5	4	3	2	1

This person feels in no uncertain terms that garbage collection schedules are inadequate.

In regard to this conference I feel that:	Strongly Agree	Agree	Un-decided	Dis-agree	Strongly Disagree
1. The purposes of this program were clear to me.....	5	4	3	2	1
2. Specific purposes made it easy to work efficiently.....	5	4	3	2	1
3. The objectives of this program were not the same as my objectives.....	5	4	3	2	1
4. I didn't learn anything new..	5	4	3	2	1
5. The material presented was valuable to me	5	4	3	2	1
6. I could have learned as much by reading a book	5	4	3	2	1
7. The speakers really knew their subjects	5	4	3	2	1
8. I was stimulated to think objectively about the topics presented	5	4	3	2	1

	Strongly Agree	Agree	Un-decided	Dis-agree	Strongly Disagree
9. The sessions followed a logical pattern	5	4	3	2	1
10. The schedule was too fixed	5	4	3	2	1
11. The group discussions were excellent	5	4	3	2	1
12. There was very little time for informal conversation	5	4	3	2	1
13. My time and money were well spent	5	4	3	2	1
14. The program met my expectations	5	4	3	2	1
15. Everything was done for my physical comfort	5	4	3	2	1

PART II

Directions

Conferences can achieve many different kinds of values. Read each statement carefully and decide how well it was achieved in this conference. Precede every statement with "In my opinion, this conference . . ." then respond to that statement by circling the number which best expresses your opinion. Please answer all statements.

In my opinion, this conference:	Very well	Well	Fairly well	Not at all
16. Increased my effecitveness in my chosen profession	4	3	2	1
17. Satisfied my curiosity	4	3	2	1
18. Allowed me to make new friends	4	3	2	1
19. Supplied answers to my questions	4	3	2	1

	Very well	Well	Fairly well	Not at all
20. Provided me with new ideas about research	4	3	2	1
21. Solved a problem related to my job.	4	3	2	1
22. Provided me with concrete facts about research	4	3	2	1
23. Provided me with new insights about research	4	3	2	1
24. Helped me to fit together theory and practice	4	3	2	1
25. Provided time for reflection and speculation	4	3	2	1
26. Increased my competency in my present job	4	3	2	1
27. Developed new intellectual interests for me	4	3	2	1

Comments; _____

_____

_____

_____

_____

Following are the results of the evaluation instrument as tallied from the responses of the workshop participants:

Evaluation Items	Strongly Agree 5	agree 4	Un-decided 3	Dis-agree 2	Strongly Disagree 1	Total
	RESPONSES					
1. The purposes of this program were clear to me	6	12	3	0	1	22
2. Specific purposes made it easy to work efficiently	3	16	2	1	1	23
3. The objectives of this program were not the same as my objectives	1	5	3	10	5	24
4. I didn't learn anything new	0	1	0	8	13	22
5. The material presented was valuable to me.	9	11	0	2	0	22
6. I could have learned as much by reading a book	0	2	0	11	10	13
7. The speakers really knew their subjects .	5	12	4	0	0	21
8. I was stimulated to think objectively about the topics presented	6	13	1	2	0	22
9. The sessions followed a logical pattern.	8	14	0	0	0	22
10. The schedule was too fixed.....	1	1	1	14	4	21

Evaluation Items	Strongly Agree 5	agree 4	Un-decided 3	Dis-agree 2	Strongly Disagree 1	Total
	RESPONSES					
11. The group discussions were excellent	6	10	1	4	1	22
12. There was very little time for informal conversation	1	3	2	13	1	20
13. My time and money were well spent	7	14	0	0	2	23
14. The program met my expectations	4	13	1	1	1	20
15. Everything was done for my physical comfort	13	6	1	0	0	20
16. Increased my effectiveness in my chosen profession.....		5	13	4	0	22
17. Satisfied my curiosity		7	9	3	3	22
18. Allowed me to make new friends		16	6	0	0	22
19. Supplied answers to my questions		7	8	7	0	22
20. Provided me with new ideas about research.		10	6	5	0	21
21. Solved a problem related to my job		5	9	5	3	22
22. Provided me with concrete facts about research		8	10	3	1	22
23. Provided me with new insights about research		11	9	1	1	22

Evaluation Items	Strongly Agree 5	Agree 4	Un-decided 3	Dis-agree 2	Strongly Disagree 1	Total
	RESPONSES					
24. Helped me to fit together theory and practice		5	12	4	1	22
25. Provided time for reflection and speculation		4	12	6	0	22
26. Increased my competency in my present job.....		1	12	8	1	22
27. Developed new intellectual interests for me...		8	8	5	1	22

Workshop Evaluation Comments

Some specific comments were made by participants as part of the evaluation instrument. These comments were solicited in an effort to obtain a more comprehensive evaluation.

1. Three hours was not enough time for the case studies. Perhaps only one case study of more time would have assisted more. Very excellent program organization and administration. Rewarding professional fellowship.

2. In another program I would eliminate the tour of the library. I felt that the half day spent could have been condensed into a half hour. More structure could be given initially to the case problem. It was not as necessary on the second case problem. I would like to see more interaction with consultants in small group sessions. All in all, it was an excellent workshop!

3. Conference was very worthwhile both from the standpoint of what I will be able to go forward with and in the ability to help teachers who will be doing research.

4. After one week, I wrote myself a critique in which I recognized that I was receiving more advantages than the comments of many suggested they were receiving. I then attributed this to three things: (a) My interest and concern for administrative problems both in conducting workshops and in RCU administration; (b) My excess of curiosity in several fields, not just my own; (c) My feeling that I could selectively accept or conversily reserve for further evidence statements of consultants. In short, I felt comfortable. As I had previously hoped, I found at the end of two weeks that I had heard a broad range of opinions most of which had some merit. I most appreciate the new minds I have met. Next I appreciate the overall picture I received as to research efforts in the Intermountain Region. Thirdly, I appreciate the efforts at objectivity and the ability of staff to communicate together. I do recognize the increase in favorable comments from participants as time progressed.

5. I would very much have liked to have at least a whole day with Sid High evaluating acceptable and unacceptable proposals. I was particularly irked by almost every consultant prefacing his presentation by "I don't know what has gone on before me . . ." The consultants could possibly have been briefed more adequately. You have a beautiful campus and gorgeous country. You must be very proud of it.

6. Members representing the other seven states gave excellent presentations. I believe they (some) could be used more in part of the program. RCU staff gave excellent presentations and were very advanced in their viewpoints. Well run workshop.

7. Another conference of this type might well include summaries of research in specific areas of Voc-Tech Ed. Another conference might provide for blocks of time in which the conferees may structure activities, topics.

8. Speakers with T & I backgrounds should have been on the program. People sleeping and missing class consistantly. Something should be done, but I don't have any suggestions. The fellowship and social activities were very well planned and carried out. Congratulations!

9. The time spent at this workshop was well worth the effort. It has been educational. The new friends made and exchange of ideas was established well. I can now say research has a living need in our schools. Thanks for the good times here and the friendly atmosphere. See you again.

10. Illustrations from speakers should have been pulled more from Voc. Ed. rather than economics and sociology. It would have been profitable to me to have looked critically at some proposals before attempting to write one.

11. The only problem I saw was in the area of the case problems. The manner in which they were structured placed the participants in a position of defending his proposal and thus might have inhibited his learning. It might have been more effective to allow the participant to question the consultant's proposals on a specific situation.

12. My greatest concern was the strict conformity to schedule and the long 1½ hour sessions between and after breaks. A more broken and interrupted daily session with the opportunity to visit and move around should seemingly provide for continued workshop interest. Planned outside activities were excellent.

13. In near future, would like to see workshop of this type created solely for all of the RCU people in either a certain area or for the United States. Would be made up of RCU people both as participants and consultants.

14. This was a particularily well conducted conference. Realistic schedules were maintained with all principals available at announced times. Consultants seemed extremely knowledgeable as well as enthusiastic. Such conferences should be perpetuated.

15. Too long. One week would have been enough. Not enough information about nature of workshop before it began. Not enough information about living accomodations. (Only one motel recommended.) Expensive. Workshop cost me more than was provided to pay expenses.

16. Sessions of shorter length may have kept up interest. More time in actual practice with proposals could be allowed. In fact, a whole conference of project proposal would be beneficial.

17. An outstanding feature of this workshop was the congenial atmosphere which allowed one to absorb all the knowledge one was capable of absorbing. Particularly helpful to me will be the writing and critiques of the research proposals.

18. The conference was very valuable to me. It provided new insights for the area of research and motivated me towards areas of research in my given field. The techniques and helps will stimulate me and others in my area towards more effective and detailed research.

19. Most of the consultants had prepared papers and read their presentations. Wouldn't it be more profitable to have had the paper duplicated and passed out at the beginning of the presentation. This would give the student to underscore special notes and make special notes as the presentation progresses.

20. I found it difficult at times to pay attention to the speakers because I was so darn uncomfortable in the provided chairs. I operate on the saying that "the mind can absorb only as much as the seat can stand." This is my third workshop and all of the other places had provided soft chairs and I believe I got more percentage value out of the speakers. It seems that cushioned chairs would of been a great asset for much more concentration. I also feel that the program could of been organized better by allowing full half day periods for working on the proposals. By the time each member of the group aired his opinion on a topic the time was up.

THE WORKSHOP PROGRAM

A tentative program was sent out on approximately June 1, 1966. This program was sent to all participants whose names had been submitted as ones interested in attending this workshop. It was also sent to all consultants to give them an idea of the general nature of the total two-week workshop.

Approximately three days before the beginning of the workshop, the comments which were received from the individuals concerning the tentative program were evaluated and a revised program was developed which was duplicated for distribution at the opening day of the conference.

Following is a copy of the workshop schedule as used during the two week period. It was found that very little deviation was necessary from the schedule as presented. The major deviation was a change in chairmen for some of the days.

MOUNTAIN STATES REGIONAL WORKSHOP

ON RESEARCH IN VOCATIONAL AND TECHNICAL EDUCATION

Utah State University
Logan, Utah

June 13 - 24, 1966

Sponsored by:

Utah State Board of Education
Research Coordinating Unit
and
Utah State University

RESEARCH WORKSHOP OBJECTIVES

Review and sharpen research techniques of the participants in the field of Vocational and Technical Education.

Provide an opportunity for the participants to engage in the design of a research project.

Develop both critical consumers of research and producers of research.

PLANNING COMMITTEE

Norm Hyatt, RCU Director
Sandra Noall, RCU Associate Director
Austin Loveless, RCU Associate Director
John Stephens, RCU Associate Director
Carl R. Bartel, Workshop Director

FUNDING AGENCY

U. S. Office of Education

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MOUNTAIN STATES REGIONAL WORKSHOP

ON RESEARCH IN VOCATIONAL AND TECHNICAL EDUCATION

June 13 - 24, 1966

Workshop Schedule

Engineering Building L 235

Monday, June 13	Chairman, Carl R. Bartel, Workshop Director
8:00 - 8:45	Registration
8:45 - 9:15	Welcome Daryl Chase, President, Utah State University Clayton Clark, Engineering Experiment Station
9:15 - 9:30	Conference Orientation and Introduction Carl R. Bartel
9:30 - 10:30	The Goals for Vocational and Technical Education in the Decade Ahead Ray Jongword
10:30 - 10:45	Break
10:45 - 11:45	Intradisciplinary Approach to Research in Vocational and Technical Education Robert Campbell
11:45 - 1:15	Lunch
1:15-3:00	Current Research in Vocational and Technical Education Sid High
3:00-3:15	Break
3:15-4:00	Introduction to Case Problem No. 1 Robert Campbell
Tuesday, June 14	Chairman, Stan Richardson
8:30-10:00	Resource Materials for Use in Vocational and Technical Education Research Kent Wood
10:00 - 10:15	Break

10:15-11:45	Tour of and Orientation to Curriculum and Research Library Kent Wood
11:45-1:15	Lunch
1:15-3:15	Group Meetings of Case Problem No. 1
3:15-3:30	Break
3:30-5:00	Reporting session - Each group reporting to Consultant
Wednesday, June 15	Chairman, Garth Hansen
8:30-10:00	Statistical Treatment of Data Don Sisson
10:00-10:30	Break
10:30-11:00	Data Processing and Computer Center Operation Edward Sharp
11:00-11:45	Tour of Computer Center Don Sisson Edward Sharp
11:45-1:15	Lunch
1:15-2:15	Statistical Treatment of Data Don Sisson
2:15-2:30	Break
2:30-3:30	Group Meetings
3:30-5:00	Reporting Session
Thursday, June 16	Chairman, John Stephens
8:30-10:30	Designing of Questionnaires, Opinionnaires, and Interviewing Guides Alvin H. Scaff
10:00-10:15	Break
10:15-11:45	Designing of Questionnairs, Opinionnaires, and Interviewing Guides Don Sisson

11:45-1:15	Lunch
1:15-3:15	Group Meetings
3:15-3:30	Break
3:30-5:00	Reporting Session
7:00	Smorgasbord - Union Building D. Wynne Thorne, Speaker

Friday, June 17 — Chairman, Carl R. Bartel

8:30-10:00	Design of Experimental Studies Alvin H. Scaff
10:00-10:15	Break
10:15-11:45	Design of Experimental Studies Alvin H. Scaff
11:45-1:15	Lunch
1:15-2:30	Critique session on Case Problem No. 1 Robert Campbell Alvin Scaff
2:30-2:45	Break
2:45-3:30	Introduction to Case Problem No. 2 James Shaver

Monday, June 20 — Chairman, Carl R. Bartel

8:30-10:00	Analyzing Data and Interpreting Research Findings Martin H. Acker
10:00-10:15	Break
10:15-11:45	Analyzing Data and Interpreting Research Findings Martin H. Acker
11:45-1:15	Lunch
1:15-3:15	Group Meetings on Case Problem No. 2
3:30-5:00	Reporting and Critique Session

Tuesday, June 21	Chairman, Austin Loveless
8:30-10:00	Writing the Research Report James Shaver
10:00-10:15	Break
10:15-11:45	Writing the Research Report James Shaver
11:45-1:15	Lunch
1:15-3:15	Group Meetings on Case Problem No. 2
3:15-3:30	Break
3:30-5:00	Reporting and Critique Session
Wednesday, June 22	Chairman, Calvin Lowe
8:30-10:00	Dissemination and Use of Research Findings Martin H. Acker
10:00-10:15	Break
10:15-11:45	Implementation and Dissemination of Research Findings Austin Loveless Sandra Noalls John Stephens
11:45-1:15	Lunch
1:15-3:15	Group Meetings on Case Problem No. 2
3:15-3:30	Break
3:30-5:00	Reporting and Critique Session
Thursday, June 23	Chairman, William Mortimer
8:30-10:00	Financing Research at the National Level Norm Hyatt
10:00-10:15	Break

10:15-11:45	Financing Research at the State, District and School level Ianthus Wright
11:45-1:15	Lunch
1:15-3:15	Critique session on Case Problem No. 2 Austin Loveless Sandra Noall John Stephens
5:00-8:00	Canyon Party

Friday, June 24 — Chairman, Carl R. Bartel

8:30-10:00	Stimulating Staff to do Research Robert G. Whittemore
10:00-10:15	Break
10:15-11:45	Workshop Evaluation Norman Hyatt Workshop Participants
11:45	Lunch

ROSTER OF WORKSHOP PARTICIPANTS

The following is a list of the participants who attended the workshop, including current addresses which indicate states represented at the Mountain States Regional Workshop:

Anderson, Bill
Arizona State Dept. Voc. Ed.
412 Arizona State Bldg.
Phoenix, Arizona
Supervisor of Industrial Arts

Barnett, Maurice C.
State Board of Education
136 East South Temple
Salt Lake City, Utah
Admin. Research & Planning

Carr, Duane S.
Utah Board of Education
136 East South Temple
Salt Lake City, Utah
Research and Planning

Crebo, Barbara
Department of Public Inst.
1019 Hollens
Helena, Montana
Research Assistant

Douglas, Leonard
New Mexico State University
University Park, New Mexico
Professor of Education

Eldredge, Garth M.
Salt Lake Trade Tech. Inst.
434 South Sixth East
Salt Lake City, Utah
Dean of Students

Garneski, Thomas M.
Maricopa J. C. District
Phoenix, Arizona
Research

Hirschi, Harvey C.
State Board of Education
136 East South Temple
Salt Lake City, Utah
Specialist, Occupational & Career Guidance

Lillehaug, Selmer
Emily Griffiths Opportunity School
Denver, Colorado
Coordinator of Apprenticeship

McKell, William E.
Granite School District
340 East 3545 South
Salt Lake City, Utah
Director of Voc. Education

Nightwine, William H.
Wyoming State Dept. of Ed.
State Capitol Building
Cheyenne, Wyoming
Research Assistnat

Ossmen, Elvin H.
State Board of Education
136 East South Temple
Salt Lake City, Utah
Research and Planning

Peevers, Alfred
Nevada State Dept. of Ed.
Carson City, Nevada
Field Supervisor, MDTA

Perryman, Bruce C.
State Department of Education
State Capitol Building
Cheyenne, Wyoming
Research Information Specialist

Glenn, John W.
Northern Arizona University
Flagstaff, Arizona
Vocational & Tech. Teacher Trainer

Prust, Z. A.
Arizona State University
Tempe, Arizona
Associate Professor
Industrial Education

Richman, R. W.
University of Idaho
Moscow, Idaho
Assistant Director
Occ. Res. Unit

Ross, Donald R.
University of Arizona
1302 East Lee
Tuscon, Arizona
Field Supervisor in Rehab.

Russell, Melvin R.
Sky View High School
Smithfield, Utah
Instructor, Business
and Office Occupations

Griffiths, John
Murray High School
Murray, Utah
Vocational Metals Instructor

Schoonover, Vic
State Department, RCU
Santa Fe, New Mexico
Asst. Director, RCU

Stevenoski, John J.
Albuquerque Public Schools
Albuquerque, New Mexico
Teacher-Coordinator
Distributive Education

Youngs, Paul A.
Grand Canyon College
3300 W. Camelback Road
Phoenix, Arizona
Asst. Prof. Science

ROSTER OF CONSULTANTS

Consultants selected to participate in the workshop were the following:

Dr. Martin Acker, Head
Counseling Psychology Program
School of Education
University of Oregon
Eugene, Oregon 97043

Dr. Robert Campbell, Head
Department of Economics
College of Liberal Arts
University of Oregon
Eugene, Oregon 97043

Dr. Sidney C. High, Jr.
Project Coordinator
Division of Adult & Voc. Research
Bureau of Research
Office of Education
Washington, D. C.

Dr. Norman F. Hyatt
Director, RCU
Utah State Board of Education
136 East South Temple
Salt Lake City, Utah

Dr. Ray E. Jongeward
Director of Research
State Department of Education
Olympia, Washington

Dr. Austin G. Loveless
Associate Director, RCU
Utah State University
Logan, Utah

Mrs. Sandra H. Noall
Associate Director, RCU
Salt Lake Trade Technical Inst.
431 South Sixth East
Salt Lake City, Utah

Dr. Alvin H. Scaff
Associate Dean
Graduate College
University of Iowa
Iowa City, Iowa

Mr. Edward Sharp
Programmer
Computer Center
University of Utah
Salt Lake City, Utah

Dr. James Shaver
Professor
Educational Research
College of Education
Utah State University
Logan, Utah 84321

Dr. Donald Sisson
Associate Professor
Department of Applied Statistics
College of Science
Utah State University
Logan, Utah 84321

Mr. John F. Stephens
Associate Director, RCU
414 Business Office Building
University of Utah
Salt Lake City, Utah

Dr. Robert Whittemore
Director
Counseling and Testing
University of Nevada
Reno, Nevada

Mr. R. Kent Wood
Chairman
Department of Library Science
Utah State University
Logan, Utah 84321

Mr. Ianthus Wright
Specialist
Curriculum Research
Office, State Superintendent
of Public Instruction
136 East South Temple
Salt Lake City, Utah

Planning Committee

Most of the planning for the two week workshop was carried out by the Research Coordinating Unit along with the Research Workshop Director. The Planning Committee and their positions follows:

Norm Hyatt, RCU Director
Sandra H. Noall, RCU Associate Director
Austin G. Loveless, RCU Associate Director
John Stephens, RCU Associate Director
Carl R. Bartel, Workshop Director

UTAH STATE UNIVERSITY'S WORKSHOP BUDGET

The following is the budget provided Utah State University by the Utah State Board of Education, contracting agency for the Research Training Program:

Total Budget

Item	Amount Budgeted	Amount Expended
Secretarial	$ 250.00	$ 320.00
Staff Benefits	12.50	15.50
Supplies	200.00	225.00
Communications	100.00	100.00
Final Report	300.00	315.00
Participants Per Diem	3,300.00	3,300.00
Participants Travel	1,905.26	1,905.26
Total	$6,067.76	$6,180.76

Utah State University contributed an additional sum of money (secretarial, etc.) to conduct this workshop. The total contribution by the University includes this additional sum and also the use of facilities and utilities during the two-week period.

Participants and Participant Expenses

Participants	Participant Allowance	Mileage	Total
Anderson, Bill	$ 150.00	$ 127.40	$ 277.40
Barnett, Maurice C.	150.00	13.02	163.02
Carr, Duane S.	150.00	13.02	163.02
Crebo, Barbara	150.00	64.54	214.54
Douglas, Leonard	150.00	159.53	309.53
Eldredge, Garth M.	150.00	13.02	163.02
Garneski, Thomas M.	150.00	129.50	279.50
Glenn, John W.	150.00	223.72	373.72
Griffiths, John	150.00	14.56	164.56
Hirschi, Harvey C.	150.00	13.02	163.02
Lillehaug, Selmer	150.00	85.61	235.61
McKell, William E.	150.00	13.02	163.02
Nightwine, William H.	150.00	86.45	236.45
Ossmen, Elvin H.	150.00	13.02	163.02
Peevers, Alfred	150.00	102.27	252.27
Perryman, Bruce C.	150.00	86.45	236.45
*Prust, Z. A.		129.50	129.50

*Dr. Prust was also a visiting professor in Industrial & Technical Education and was not eligible for participant allowance.

Participant	Participant Allowance	Mileage	Total
Richman, R. W.	150.00	112.98	262.98
Ross, Donald R.	150.00	149.17	299.17
Russell, Melvin R.	150.00	1.12	151.12
Schoonover, Vic	150.00	110.25	260.25
Stevenoski, John J.	150.00	116.69	266.69
Youngs, Paul A.	150.00	127.40	277.40
Total	$3,300.00	$1,905.26	$5,205.26

MOUNTAIN STATES REGIONAL WORKSHOP

ON RESEARCH IN VOCATIONAL AND TECHNICAL EDUCATION

JUNE 13 - 24, 1966

PRESENTATIONS, AND HANDOUTS

Sponsored By:

Utah State Board of Education
Research Coordinating Unit

and

Utah State University

VOCATIONAL EDUCATION IN THE DECADE AHEAD-- WITH RESEARCH IMPLICATIONS

By Ray E. Jongeward

Our great nation, in ten short years, will be celebrating its 200th anniversary. What will 1976 be like? Perhaps the answer to this question was much more predictable 100 years or even 50 years ago than it is today. The stability of population and the nation's technology were dependable growth factors and fairly easily and reliably predicted. Anyone venturing opinions or predictions today of what the future will bring is usually treated suspiciously or written off as a visionary and crack pot. Therefore, my assignment this morning of discussing the future of research in vocational education is relatively easy since what I say to you can be discarded quickly by using any or all of the above classifications.

Historically, our country has turned to schools and colleges to meet the needs of the day. During the 1800's the movement to establish free public schools was a burning issue in the towns and villages and the state legislatures of our nation. If this had not been successful, self government in the United States would not have developed and grown; there would have been no educational base for the development of the skilled trades needed in our growing economy; there would have been no effective means for developing an American way of life from the many diverse national and cultural origins of the people who came to our great land.

A paper presented by Ray E. Jongeward, Director of Research, Washington State Office of Public Instruction, at the Mountain States Regional Workshop On Research In Vocational and Technical Education, June 13, 1966, Utah State University, Logan.

Approximately one-hundred years ago, Lincoln signed the Morrill Land Grant Act (1862) that enabled states to support higher education for their people. This foundation spread the opportunity for higher education to large numbers of people that contributed greatly to the development of the West, to the development of our system of free, public schools, and to manage the rapid industrial and technical growth that followed the Civil War.

It has been decisions such as these that have been instrumental in shaping modern America. Today, we hear new voices for extending and enlarging educational opportunities for <u>all</u> citizens of our nation. The early years (ages 4-7) are now being recognized as highly important years in the life education of individuals. Post high school education is also being considered as a vital component to the preparation of all citizens, free and available to anyone who wishes to take advantage of this requisite for living the "good life."

It is now recognized that only as we have armed our citizens with the powers of education have we been able to cope with new challenges and to gain new levels of freedom. Some wit recently said as he attempted to capsulate the recent decades of our nation's history that the:

1930's were dominated by the politician, the
1940's were controlled by military men, the
1950's were the age of the scientist, and the
1960's were going to be determined by the educator.

With the myriad of recent federal legislation aimed directly at strengthening the educational enterprise we can easily believe that education is once again being expected to shoulder the responsibility for finding ways of coping with the future. It seems that we have not yet quite realized the age in which we live; the time when 90% of all research scientists who

have ever lived are alive today; the time when about half of the R & D money spent in all our history has been spent in the last eight or nine years; and the time when a discovery today is reported somewhere in the world tomorrow or no later than the day after tomorrow! No, we do not fully understand the day and age in which we live.

Perhaps, then, it is little wonder that the nation has again turned to education to obtain an answer to the question: How can we equip our future citizens to live and prosper in an age of rapidly changing technology? One authority has estimated that, for example, to handle today's nationwide load of phone calls with the technology available in 1920 would require all the workers in the whole country.

Automation, almost a dirty word a few years ago, is now being understood in a new and revealing light. Instead of machines replacing the highly skilled, creative individual worker we are now viewing it as promoting the demand for more sophisticated and highly developed skills. It appears that the more highly automated a manufacturing system is, the higher the skills required to design it; to build it; to operate it; and, to maintain it. Last night on the plane coming to Salt Lake City I read the following advertisement in the Mainliner magazine that illustrates this point:

> What happens when an industry introduces machines far more efficient than those used before? Many would say that adverse effects on employment are bound to follow but let's examine a specific case.
>
> About seven years ago the U. S. scheduled air carriers began introducing jet aircraft, of which some are almost four times as productive as propeller planes. The airlines at that time employed approximately 160,000. Did the new machines stimulate or depress employment?
>
> The airlines now have about 200,000 on their payrolls. In addition, many thousands more have gone to work for jet aircraft builders and various airline support manufacturers. New jet orders are keeping these plants at high levels of production.
>
> Over the next five years airline employment is expected to increase by 50,000. United Air Lines will participate in this expansion. We have fine opportunities open, not only for pilots and mechanics, but for many other types of

> technical, professional and management employees. This includes market and budget analysts, accountants and computer specialists.

Strangely enough, we are also realizing that not only does our economy need skilled people, it also needs their wages. The reason being that the products of automation usually cost more, are more complicated and few workers could afford these improved products if they were low-paid and unskilled.

This point finally leads me to vocational education. Our nation's economists have only recently given much of their attention to the matter of skills. They have come to realize that a man's skill--whether he works with his head, his hands, or both--is a vitally important kind of capital, and that the education and training from which he learns that skill are an equally important kind of investment. Thus recently we have been seeing and hearing slogans like: EDUCATION--An Investment or Education; the greatest growth business in America.

Most speakers, especially those discussing research topics, tend to substantiate their views by quoting prominent men in the world or use a convincing array of statistics to prove their points. It is past time that I fall prey to these practices, therefore, to be doubly convincing I'll use them both!

The chairman of the board of the Standard Oil Company (New Jersey) in a recent speech said:

> In 1930 less than 30 per cent of our young people graduated from high school; now the percentage is about 65. In 1930 college degrees were awarded to 140,000 people; this year the number will be about half a million. In the past 35 years the total price tag on the education and training which members of the American labor force carry around in their heads has approximately tripled, and stands today at well over $600 billion, or roughly $10,000 for every employed person.
>
> All these figures simply point up a truth which is so much a part of our daily experience that we tend to ignore it:

> The most important capital that any economy possesses is in the skills which people carry around in their heads.*

I will assume that I have established myself in such company and now have the courage to proceed with some strictly personal views as a participant observer of the educational scene. In preparation for this presentation to you today, I managed to steal a bit of time reflecting on the educational events of the day and to ask a few people with whom I've had recent contact: What do you think vocational education will be like in 1976? This talk is the result of these two highly unusual activities--i.e., thinking and listening. What follows are my own personal interpretations, invalid as they may be, since they are not documented as truths to which everyone should subscribe. Also, since you are or will soon become sophisticated researchers, these prognostications of the future that will affect vocational education are not in rank order! Here they are:

(1) Increasing amount of money will be spent on R & D--especially D, e.g., USOE Bureau of Research from $1 M in 1956 to approximately $103 M in 1965--prediction $1 B by 1970!

(2) Comprehensive educational opportunity will be more available to all. The disadvantages, preschoolers, aged, handicapped, etc., will all have increased opportunity to become educated regardless of financial situation and up to their capacity to achieve.

(3) Extending the period of preparation for life and work will be commonly accepted. Lifelong education will become a reality. Part-time employment and part-time schooling will be even greater in the next ten years. Education and re-education will be recognized and planned for.

(4) There will be a forced "melding" of general education and vocational education; of divisions and specialities within vocational education,

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*An address by M. J. Rathbone, Marshall University, West Virginia.

i.e., Agri-Distribution business as a technology for students entering food processing industries in Washington State.

(5) Secondary schools (grades 7-12) having catered almost exclusively to the 20% of students who go to and graduate from college will become more concerned for the other 80%. Entry level occupations will be emphasized beginning in 10th or 11th grade and continuing on to all occupations not requiring a BA degree. Emphasis will be on "work plateaus" where students may get off the education path temporarily or permanently to use saleable skills they have learned.

(6) Instruction in schools will be centered more on specific learning objectives. Broad concepts needed for understanding subject content will be isolated yet related to skills and the job. Core instruction or cluster skills that are common to a wide variety of occupations will be identified making specialization a matter of concern for private enterprise. There will be less emphasis on courses, clock hours, etc., more on learning objectives. It will likely be non-graded with entry and graduation may be anytime during the school year.

(7) Advanced technology will enable educators to truly realize the long sought ideal of individualizing instruction. The knowledge of the world will be available to everyone electronically, e.g., the school of tomorrow may be, an expert says, a one room school in each block with the knowledge of the world available to it electronically. Individual skills and abilities will be more easily diagnosed making it possible to "match" materials and curricula to the specific learning needs and abilities of the individual student.

(8) Greater attention will be focussed on affective behavior, i.e., attitudes, motivation, perceptions, etc.

(9) Emphasis is increasing on the "systems" approach to learning and teaching. The experiences and materials that produce the desired goals will be welded into a curriculum that <u>will</u> produce results, i.e., Litton, 90/90 criteria.

(10) Evaluation , an intellectual curiosity of the past, will become an integral part of curriculum and instructional materials and programs. Does it work? For Whom? What are the results? These factors determined thru field testing and evaluation will be built into them.

(11) Program budgeting will affect education in such a way that there will be greater accountability for dollars spent and results produced (McNamara and DOD, Dept. of Defense) (Tyler and the Gross Education Product).

(12) Regional and even national approaches to education problems will greatly increase. The high mobility of our society will demand solution to commonly recognized education problem, i.e., education of migrants, minorities, etc. The newly established Regional Educational Labs are good examples of such approaches.

(13) The use of private enterprise as a viable partner in education is going to greatly alter old concepts of financing and administering education. Recent contracts for Job Corps centers with businesses, such as Litton, Time-Life Inc., Westinghouse, G.E., and other indicate this fact. Note: Oakland (Mich.) Community College.

(14) Ironically and last on my list and possibly in the chronology of actual events, teacher training will be altered in a revolutionary way. The schools of 1976 will in no way look like the ones we have today--neither will the training institutions for our teachers.

Educational simulation, used successfully in our space training programs will have valuable "spin off" applications in vocational education. (Rand example of learning rate 14:1)

My list is admittedly incomplete. Each one of you could have easily made your own. It would likely omit some items I have listed and included others that are equally valid. My claim, you'll recall, was not one of validity and if you like you can classify me as a visionary or crackpot. I will admit that the total effect is quite utopian.

My task today is unfinished. At least there are a few things that still must be said. I will attempt to say them briefly and with dispatch.

The challenges in the decade ahead for vocational education--yes, for education in general and for research may be summarized as three: (a) communication (b) a general upgrading of skills and (c) adaptability.

Great as the problem of communication may be within education itself, a greater challenge exists between educators and business and industrial leaders. The local educator sees tremendous needs ahead; for staffing the schools to provide for greater numbers of students; for up dating and keeping the curriculum current and meaningful; for financing an ever expanding enterprise; and, for gaining community support and understanding. The business and industrial leader looks ahead and sees a continuing revolution in technology and organizational structure and wonders how the schools can somehow prepare students to enable him to compete in an increasingly complex and industrialized society. The problem is: How can the educator involve and communicate with the business community to gain the support needed that will enable education to be an effective force and to realize its full potential in the lives of the citizens of our country? Are there ways business leaders can assist in the task of explaining education needs to the voters? Obviously, the answer is yes but they must become actively <u>involved</u> and <u>welcomed</u>!

Secondly, we know that the percentage of unskilled jobs available in the labor market is going down. The trend will continue. On the other hand the percentage of highly skilled professional and technical jobs is going up. The trend will continue. The challenge is clear. It is extremely important today, and in the decade ahead, for each student to stay in school or college and learn up to the limit of his or her actual potential. We must ask ourselves as educators, are we preparing students how to learn, to think and to adapt in our rapidly changing technology? Are we training only a few highly skilled specialists to benefit from this advancement? What of those who are left behind?

The third factor, adaptability, is becoming increasingly prominent in the preparation of today's youth. You know the figures; 70% of the skilled trades in American manufacturing in 1900 no longer exist. We can count on the fact that a large proportion of today's skills will become obsolete in the span of one man's work lifetime. Specialities are perishable and often die.

How can man be properly educated to be able to adapt to these changing working requirements? Quality education can form the basis for enabling man to more easily adapt to these conditions. How can we assure this needed quality to all our future workers? How can the doors of educational opportunity be kept open for everyone so that they may be enabled to continue to be employed productively and enjoy the abundant fruits of their labors?

In my estimation, these are the primary challenges of our times as we peer into the future and set our course for the decade ahead. As we prepare to celebrate the 200th birthday of our land, we must be ever aware that every individual in a free society has the right of free choice--in religion, in politics and in the job he chooses and in its location. We must help him realize these important values.

GUIDLINES

FOR THE

DIVISION OF ADULT AND VOCATIONAL RESEARCH

U.S. Department of Health, Education, and Welfare
Office of Education
Bureau of Research

November, 1965

GUIDLINES
FOR THE
DIVISION OF ADULT AND VOCATIONAL RESEARCH PROGRAMS

The Division of Adult and Vocational Research (DAVR) supports a broad spectrum of research and development programs designed to help present and prospective members of the labor force acquire the basic knowledge, skills, and personal characteristics necessary to insure continuing and satisfying working careers. The vocational research and development responsibilities of the Division are focused on strengthening vocational education capabilities at all levels below that of the baccalaureate degree. Special emphasis will be directed to the needs of young people from families with low incomes who have academic, socioeconomic, or other handicaps which prevent them from succeeding in regular vocational education programs. Research in the area of adult and continuing education will receive increasing attention as funds are appropriated for this purpose.

The Vocational Education Act of 1963 (P.L. 85-210) authorized $11.85 million for research, demonstration, and training grants for 1965, to be increased by two annual steps to an appropriation of $22.5 million. This appropriation can be used to support projects submitted by colleges and universities, State boards, public or nonprofit private research agencies, and with state board approval, by local educational institutions.

To carry out the purposes of the Division's research and development program, DAVR has been organized into three branches: The Employment Opportunities Branch, the Human Resources Branch, and the Educational Resources Development Branch.

1. The Employment Opportunities Branch concentrates on those Division programs which relate to economic and occupational information needed to plan

administer, and evaluate programs of adult and vocational education, to facilitate students' career choices, and to ease transitions from school to work and from job to job. Emphasis is given to improved techniques for communicating such information to different age groups and to persons with varying backgrounds, interests, and abilities. The Branch invites research which examines the range and kind of available occupational opportunities, identifies job or skill clusters to which adult and vocational education can be directed, estimates future occupational supply and demand, and assesses the personal and technical competencies and aptitudes required for successful entrance and advancement in a constantly changing work situation. The Employment Opportunities Branch also stimulates comparative cost-benefit studies of different methods for developing occupational skills -- institutional, military, industrial, and on-the-job training. These studies should include an analysis of employment and income effects, fiscal and administrative relationships, and other social and economic factors affecting the character, extent, and efficiency of public and private programs.

2. The Human Resources Branch focuses on the person preparing for or involved in the world of work. The relationship between a student's background, his family, his abilities and aptitudes, his motivations and aspirations, and his performance in school and on the job should be considered carefully. Similar factors must be weighed in terms of adult participation in learning activities. Although emphasis is placed on basic research, developmental projects which will contribute to more effective educational programs for the noncollege bound student and for adults are invited. The efforts of a variety of behavioral scientists, such as sociologists and

psychologists, as well as vocational educators and adult educators, must be utilized in studying human resources development.

3. The Educational Resources Development Branch concerns itself with the improvement of existing vocational programs and the development of new programs and the personnel to run them. This branch stresses research, experimental, developmental, and pilot programs and evaluates their success in the fields of curriculum development, instructional media and methods, organization, administration, teacher education, and facilities. The identification, selection, and preparation of administrative and research personnel needed to plan and conduct the programs are also emphasized.

1966 - 1967 PRIORITIES

Seven areas of special emphasis, selected by DAVR for priority attention during the coming year, are listed in the order of their priority: program evaluation, curriculum experimentation, personal and social significance of work, personnel recruitment and development, program organization and administration, adult and continuing education, and occupational information and career choice.

1. Program Evaluation

Since the Vocational Education Act of 1963 requires that an evaluation report of federally supported vocational education programs be presented to the President and the Congress not later than January 1, 1968, highest priorities will be given to research projects designed to contribute to this evaluation. Research proposals may be prepared for the following specific problem areas designed to evaluate these programs:

a. Projects may be set up to determine the effectiveness of new vocational education programs supported by Federal funds under the 1963 Act as they relate to career patterns, employment records, and incomes of graduates and nongraduates; the amounts and kinds of vocational and on-the-job training which employers consider necessary; high school dropout rates; and other measurable factors relating to the successful participation in such programs. Particular attention can be focused on the intergovernmental fiscal relations aspect of vocational education -- e.g., the extent to which matching funds for new programs represent new resources devoted to vocational education. Evaluation will be facilitated by the development of a comprehensive data processing system.

b. Comparative studies should evaluate alternative methods of preparing individuals for work and the economic evaluation of training programs in particular occupational fields. Studies which seek to determine the relative effectiveness and costs of the many ways young people are prepared for work and the ways in which experienced workers acquire additional training will be actively pursued.

c. Projects may consider the impact of vocational education on job changes in different areas, occupations, and industries, the location and movement of industrial plants, and other aspects of economic resources mobility.

2. Curriculum Experimentation

A critical examination of present vocational and adult educational practices, particularly those relating to teaching disadvantaged youth, and

the encouragement and support of curriculum development research projects for new and emerging occupational skills should be undertaken. The need for identifying the knowledge and skills required to qualify for rapidly developing occupational opportunities will be among the highest priority projects. The establishment of new vocational program configurations which will concentrate on groupings of related occupations, such as the health services occupations, will be explored. The best developed instructional resources, media and facilities should be applied in the development of these new skills. Recent innovations in simulated training and computer based instruction, particularly those pioneered by NASA and the Armed Forces, will be explored for their relevance to vocational education. Experiences gained at the Job Corps Centers and Manpower Development and Training Act programs will be evaluated and emulated where applicable.

The Division will be interested in curriculum proposals which examine, experiment with, and offer well-articulated programs at various grades below the professional level, including the specific teaching methods and materials in the following occupational fields: health services occupations, engineering-technician occupations, recreational occupations, ornamental horticulture, building maintenance, public service occupations, social welfare occupations, and office occupations. Studies which evaluate these and other curriculum offerings and materials are also highly desirable. The primary purpose of this research should be to identify the relative effectiveness of different teaching methods and the best combination of teaching practices and materials needed to prepare workers for newly emerging job opportunities.

Research and experimentation should also be focused on new administrative structures and organizational patterns for establishing and carrying out new occupational training and adult education programs. This should include consideration of new and improved methods of teacher utilization and the application of educational technology to the needs of adult and vocational education.

3. Personal and Social Significance of Work

The concept of work as a major factor in adult life is central in our society. From his work the individual derives not only his income but also many of his personal satisfactions and his status in the social groups with which he has contact. To prepare him for his role as an employed adult and help him continue to grow both as an individual and as a member of society, it is necessary to understand how he forms his concepts of work, and how he is motivated in various work-related situations and the ways in which he derives his satisfaction from them. Knowledge about an individual's aspirations and their relationship to his abilities are vital in providing counseling and guidance. The place of different kinds of work in the value structure of the individual and in the value structure of various social groups is of major importance in his choice of an occupation. The interaction of his work and his self-concept throughout the various life-stages of adolescence, maturity, and old age must be considered in preparing the person for work entry as well as continuing education and training.

Understanding the worker as an individual and as a member of society is crucial in planning his education and evaluating his performance. Research in terms of the noncollege bound will be encouraged in all of the areas mentioned above, and developmental projects which utilize such knowledge for purposes of counseling or designing better educational programs will be considered.

4. Personnel Recruitment and Development

Accelerated technological change, space research and development, a rapid expansion of the service industries, and an expanded vocational education program at the secondary and postsecondary levels has increased the demand for vocational teachers. New area vocational schools are being built. Many high schools and community colleges are adding vocational courses. To keep pace, it is imperative that high priority be accorded to recruiting and developing competent vocational and adult education personnel. Thus the goal of this fourth area is to assist in the development of an adequate supply of the types of personnel needed to staff new programs of vocational and adult education and to develop procedures to permit the upgrading of present personnel.

Studies are needed which relate to the determination of the numbers, qualifications, and sources of persons required to staff current and projected adult and vocational programs.

Research is needed to determine what vocational teachers should be taught and how teacher preparation programs should be organized at our Nation's colleges and universities. The use of teacher aides and subprofessionals in vocational education is as potentially significant as in other facets of education.

The development of experimental programs for training new and current personnel are required. This should include the training not only of vocational teachers and counselors but school administrators and related vocational-technical-adult educational personnel. Funds are available to conduct summer and other institutes for teachers for new and emerging occupations or to upgrade the competencies of teachers presently engaged in adult and vocational programs. Proposals relating to training institutes in the following fields are invited.

(1) The Role of Ancillary Services (guidance, counseling, testing, etc.) in Improving Program Quality;

(2) Teacher Educators

a. Preparation of occupational instructors in techniques of instruction, use of audiovisual aides and various methods of utilizing programed instruction; and

b. Regional workshops for all operating directors of experimental, pilot and demonstration programs concerned with the disadvantaged;

(3) Other Clinics and Workshops

a. Workshops for junior college administrators and faculty, high school superintendents, principals, and guidance counselors to discuss postsecondary technical programs, and

b. Workshops to discuss work-study programs;

(4) Teacher Institutes on New Occupations; and

(5) Curriculum Development Institutes.

5. Program Organization and Administration

A number of investigations should be directed to the improvement of existing organizational structures of vocational education at State and local levels. Research relating to identification of factors which influence change is urgently needed. These factors include attitudes of State boards for vocational education; use of advisory groups; involvement of appropriate groups in the formulation of State plans, of matching funds, and other patterns of organization which facilitate rapid adaptation of program activities.

Successful local, State, and regional programs and their related organizational structures need to be identified and communicated elsewhere. Organizational and administrative patterns of vocational education programs already in existence need evaluation. Those that are successful need recognition and communication to other practitioners. Recent trends in general education, such as ungraded schools, team teaching, flexible schedules, and individualized instruction, need to be adapted to the purposes of vocational education.

6. Adult and continuing Education

The increased emphasis on adult and continuing education is reflected by a substantial number of federal programs, such as the Manpower Development and Training Act and the Economic Opportunity Act. This rapidly growing field requires definition and improved institutional patterns. Many previous attempts at planning have failed because of the lack of knowledge about the number and kinds of adults presently engaged in educational activities and of the number and kinds of courses and programs available to them. It is not possible to build a sound plan without a more accurate picture of the size and scope of the current enterprise.

Emphasis will be first given to determining the extent of participation in adult and continuing educatior activities. This research undertaking will probably be in the nature of a census which will provide more reliable data on the numbers of adults participating in specific kinds of educational activities.

A second undertaking of equal importance is the assessment of the kinds of courses and programs for adults currently available in this country. Substantial programs in adult education are carried on by such diverse agencies

and organizations as departments of the Federal government, colleges and universities, junior and community colleges, proprietary schools, industrial firms, labor unions, public school systems, libraries and museums, and voluntary organizations of various kinds. It is necessary to understand the nature and scope of these offerings before attempting the design of future large-scale programs for adults.

Research is also needed on the problem of what motivates adults to continue learning and how they learn. Both the motives of adults in seeking to learn and the process itself is different from what happens with children and adolescents, but definitive knowledge is lacking.

In addition, attention will be given to the development and evaluation of (1) methods of recruiting and training teachers and leaders for adult and continuing education activities; (2) ways in which adult education organizations and agencies can be coordinated in bringing their resources to bear on areas in which there is critical need for social action; (3) definition of the needs of older persons for broadening their education or learning new work skills; (4) educational programs for semiliterate adults to enable them to live more successfully in an urban environment; (5) patterns of organizing and administering new institutions or agencies designed specifically for the education of adults; and (6) value of continuing education in terms of the national economy.

7. Occupational Information and Career Choice

One of the severest handicaps of deprived youth has been the dearth of relevant occupational data and methods for effective communication of such information. Lack of knowledge about how to shape career decisions has all

too often led to the selection and preparation of youth for inappropriate careers, particularly those who can least afford to make wrong commitments.

Occupational information needs will be met though a variety of studies. For example, new and growing occupational fields will be surveyed to identify skill competencies and training requirements and to determine future employment needs. Occupational classification systems will be analyzed for possible improvement. The costs of vocational education which are borne by students, such as tuition, transportation, and earnings given up to attend school, must be weighed against the returns to the individual in personal income, job satisfaction, and other benefits.

Projects which relate to improved methods of packaging and disseminating occupational opportunity information will also be sought in order to meet the needs of specific audiences, such as the high school dropout, the slow learner, disadvantaged youth, parents, and the hard core unemployed.

Studies of the process of recruiting and selecting counselors and the entire process of vocational guidance and career choice are also important. Counseling practices which provide occupational information for the noncollege bound student should be expanded, counselor competencies assessed, and methods for thier upgrading developed.

The feasibility of establishing one or more guidance centers to provide complete guidance and counseling services for parents, students, and adults at all stages of their working careers needs to be investigated.

OTHER PROJECTS

A limited number of additional projects which do not fall in any of the priority areas may be funded if conditions warrant support of such programs.

SUBMISSION OF PROPOSALS

Proposals should be prepared and submitted in accordance with Support for Research and Related Activities. Upon request, copies may be obtained from:

Bureau of Research
U. S. Office of Education
400 Maryland Avenue, S. W.
Washington, D. C. 20202

ECONOMIC ISSUES IN THE PLANNING OF VOCATIONAL AND TECHNICAL EDUCATION

Robert Campbell, University of Oregon

I.

I don't know whether it was an intentional slip or not, but I notice that the original tentative schedule listed me under the title, "Intra - disciplinary Approach to Research in Vocational and Technical Education." I assumed that "Interdisciplinary" was intended but am more than content to proceed under the original title. What you will get then are some perhaps "undisciplined" comments on the approach of economics to research in vocational and technical education.

Economics, altogether too much like its sister disciplines in the social sciences, has not done nearly enough in this area, although a number of items have gotten placed on the agenda and are beginning to be examined. What this means is that an economist's remarks are necessarily weighted heavily on the side of conceptualization of problems and listing of research needs rather than on the side of the reporting of useful research results. Perhaps what I have to say may be sufficiently novel for those of you outside my field to provide some unfamiliar insights and suggestions that could prove useful to you. At any rate this is my hope and my personal justification for appearing before you in the first place.

As a starter I would like to try to shock you a bit by suggesting that the current heavy emphasis upon the need for comprehensive planning in the area of vocational and technical education is not fully shared by many economists. In part their attitude is historically based. As a nation, even in the recent past, we have managed to absorb proportionately many more new entrants into the labor force than is the case today without the necessity for elaborate provision of formal training and training facilities. As Alice Rivlin (7) reminds us; "there have been periods in American history when new entrants were pouring into the labor force at tremendous rates -- as a result of previous high birth rates and large-scale immigration." Indeed these were the more typical instances, but after the war-induced period of extensive training and retraining, our own experience during the 1950's was with a situation in which the depression-born generation created only a gentle trickle into the labor force. We got out of the habit of dealing with the problem and this explains, in considerable measure, our current concern. Here it is necessary to deal with two questions before proceeding any further. First, how did our nation, in the past when the problem was of even greater magnitude than it is today, deal with occupational preparation? Second, what, if anything, is there about the situation today that distinguishes it from that of the past, both in terms of the problem itself and the methods for its solution?

An answer to the first question can be approximated by examining the work preparation experience of adults in the current labor force. Rivlin (7) cites a U.S. Department of Labor study: "Labor force members aged 22-64 with less than three years of college education were asked about the types of occupational training they obtained. Over half claimed to have had no formal job training of any kind, and about seven out of ten said they had no formal training for their present job--they just picked up their skills informally on the job." It is interesting to note that younger persons were considerably more likely to have experienced some formal training than older persons, but the implication is clear: the great bulk of the labor force in the past received little or no formal advance preparation for their jobs. A study by Mincer (5) suggests similar conclusions. For the late 1950's he estimates that on-the-job training, measured in terms of cost, was at least as important as formal education for the male labor force and that the rate of return on selected investments in on-the-job training was not different from the rate of return on total costs of college education. An important, probably the most important, component in his measure of on-the-job training consisted of the informal processes of "learning from experience" rather than the more formally organized activities. As he notes: "historically, skills have been acquired mainly by experience on the job. The vast schooling system and the delayed entry into the labor force are distinctly modern phenomena." I think that we, as professionally trained people, are inclined to slip too easily into the view that the typical individual trains, or should train, for a "career". As Rivlin (7) notes, "It may be that educators should abandon the hope that they can give people skills early in life which will carry them through a lifetime 'career'. Except in a few professions and skilled trades, most people do not have careers anyway. They have a series of jobs, often quite unrelated to each other."

This brings me to my second question--is the current emergency in vocational and technical training qualitatively unique? I think only a little familiarity with our history would rule out the conclusion that it is quantitatively unique. As we have already noted, in terms of sheer magnitude, our contemporary problems are dwarfed by the task of assimilating the successive waves of immigrants around the turn of the century. They also suffer by comparison with the problems of the newly developing countries. Qualitatively, however, two related points are typically made. One has to do with our changing attitudes toward education in general and our sense of awareness of, and responsibility for, the provision of economic opportunity for all of our citizens through all means available, including education. The other has to do with the implications of technical change for employment and job preparation. In regard to the first point we have in part what the econometrician would call an identification problem. Do job characteristics, including the results of automation and technological change, require more education

or does the availability of more people with higher educational attainment lead to the upgrading of educational requirements for jobs? This problem gets blurred by the fact that rising levels of general education are difficult to separate from more vocationally oriented kinds of education--in the economist's jargon they are joint products of the educational industry. A study by Eckaus (4) relates to this problem. Drawing upon Labor Department data on average educational requirements for specific occupational categories, he concludes that there seems to be a growing amount of "unemployed" high school education in the labor force: "In 1940 and 1950, according to the census of population the proportions of employed persons who actually had at least a full high school education were 31.2 and 39.0 per cent respectively. Those needing that much education for their jobs...were 28.5 and 32.4 per cent of the labor force." This is not to minimize the importance of general education but to suggest that in many cases it is inaccurate to justify it solely on the grounds of job or occupational need. The Eckaus study estimates that between 1940 and 1950 the average years of schooling required in the labor force rose only from 9.7 to 10.1 years while the specific vocational training required rose from an average of 1.26 to 1.35 years. While this is hardly an impressive change, what about automation and the resulting upward pressure on skill requirements? Here we are faced with another identification problem. While it is true that average skill levels--the skill-mix--has been enriched, the relation between this and the automation of production processes is not nearly as clear cut as common sense insists. As background I can take advantage of the recent report of the National Commission on Technology, Automation, and Economic Progress (8), -- a report which reflects the views of many economists in addition to those on the Commission (including its chairman, Dr. Howard R. Bowen). Since I find myself strongly in agreement with the report I shall quote at some length from a section entitled "Influence of Skill and Education on Unemployment;"

> Occupational changes in the period of rapid productivity growth since 1947 exhibit a few easily identifiable broad trends. Very highly skilled employment has increased rapidly: Professional and technical workers were 6.6 percent of the total in 1947 and 12.2 percent in 1964; the number of unskilled laborers, by contrast, fell as a percent of the total, but not absolutely. In the same span of years there has been a visible shift from manual to white-collar work: In 1947 manual workers were 41 percent of the total, and white-collar workers 35 percent (the remainder were service workers, farmers, and farm laborers); by 1964, the percentage of all workers in manual occupations had fallen to 36, while white-collar occupations expanded to employ 44 percent of all workers. However, the meaning of this trend in terms of skill is far from clear: Many manual jobs are highly skilled, may clerical and sales jobs are unskilled; the requirements are different, but not easily compared.

Unemployment has been concentrated among those with little education or skill, while employment has been rising most rapidly in those occupations generally considered to be the most skilled and to require the most education. This conjunction raises the question whether technological progress may induce a demand for very skilled and highly educated people in numbers our society cannot yet provide, while at the same time leaving stranded many of the unskilled and poorly educated with no future opportunities for employment.

No confident answer can be given to this difficult and complex question. Our society is extending secondary and higher education to larger and larger fractions of the population, and therefore, it is necessary that the number of suitable and rewarding jobs should increase correspondingly. Otherwise a different kind of frustration would result. We must, then, ask a much more subtle question: Is the demand for highly educated people outrunning the supply, and is the supply of unskilled workers outrunning the demand? It is intrinsically difficult to establish any answer because occupational content can change while the occupational title remains the same, and because it is often unclear which occupations make greater demands in skill and education. Even if we were confident that there were imbalances between skills demanded and skills supplied, it would not follow that the source of the imbalance is technological. Japan and Western Europe operate sophisticated industrial economies with educational profiles far inferior to our own, and there is reason to believe that a highly automated economy could be engineered to fit a variety of educational profiles. But that is not our problem. In the shorter run, whatever the general trend, there is no doubt that technological change may increase, decrease, or simply change the skills required in particular jobs. The result may be displacement.

There is little doubt that the occupational structure of the American labor force is changing and will continue to change. Perhaps the main reason for this is the rapid growth of those industries--education, finance, insurance, health, and business services--which employ predominantly white-collar and professional workers. Another reason is the rapid improvement in educational attainment itself. Technological change within industries does not seem to be the major factor, except as regards the declining employment of laborers. Whether changes in the demand for different skills are to a substantial extent placing the new jobs beyond the reach of those losing other jobs can best be assessed by examining the relationship between educational attainment and educational requirements.

Here, too, the evidence is at best fragmentary, but the Commission is impressed with labor market developments during the business expansion following the tax reduction of early 1964. As the general unemployment rate has fallen, the improvement has been greatest for those with the least education. In 1965, the unemployment rate for those with 8 years of schooling or less fell from 7.6 to 5.9 percent; for high school graduates with no further education, from 4.8 to 4.1 percent; and for a college graduate, only from 1.5 to 1.4 percent.

It is the proper function of a market to allocate resources, and in this respect the labor market does not function differently from any other. If the available resources are of high quality, the market will adjust to the use of high quality resources; if the quality is low, methods will be developed to use such resources. In an efficient market, the choice between low-skill and high-skill manpower and between labor-intensive and capital-intensive production methods is made on the basis of relative costs. Although employment of unskilled, untrained labor can be encouraged by lowering its cost relative to that of skilled, trained labor a better way would be to generate higher rates of economic activity. (In the same way, labor and machines "compete" with each other.) In a slack labor market employers must have some means of selecting among numerous applicants, and it is not surprising that educational attainment is often used as a convenient yardstick, regardless of its direct relevance to the requirements of the job.

We have found it useful to view the labor market as a gigantic "shapeup," with members of the labor force queued in order of their relative attractiveness to employers. If the labor market operates efficiently, employers will start at the head of the line, selecting as many as they need of employees most attractive to them. Their choice may be based on objective standards relating to ability, or on dubious standards of race, sex, or age; wage differentials may also be important; and formal education may be used as a rough screening device. The total number employed and unemployed depends primarily on the general state of economic activity. The employed tend to be those near the beginning and the unemployed those near the end of the line. Only as demand rises will employers reach further down the line in their search for employees.

> If the relative disadvantages of the unskilled and uneducated have increased in recent years, the main reason is that the economy is less, not more, likely to run out of skilled and educated men and women. Thus the important factor is the impressive gain in the educational attainment of the labor force. The proportion of workers aged 18 years and over who have completed 4 years or more of high school has risen from 43.3 to 57.5 percent since 1952; those with 4 years or more of college, from 8 to 11.6 percent.

The implications in the Commission report concerning the relation of automation to our increasing skill requirements are brought our more explicitly by Raimon (6). In a study which attempted to correlate changes in the skill-mix by industry with changes in productivity between 1950 and 1960 he found only a modest positive correlation, which was partially offset by an inverse correlation between changes in productivity and changes in employment by industry. He finds his results consistent with others which conclude "that the predominant source of the overall enrichment of the skill-mix that took place during the 1950's, and which appears to be continuing, is the shift in the distribution of employment towards industries with a rich skill-mix rather than widespread intra-industry upgrading. Such high-skill industries, which (exclusive of public administration) include education, medicine, business services and professional services among the five industries showing the greatest gains in employment, are self-evidently characterized by rich skill mixes, although they rank low with respect to the rate of change in productivity." Raimon goes on to indicate the implications of his study for the automation phenomenon: "...it may be concluded that the chief impact of automation and technological change on the occupational structure of employment is found less in the changes they impose on the skill level of job content than in the increases they generate in real income, and hence in the changes induced in consumption patterns and in the distribution of employment among industries." Supplementing Raimon are several case studies of automated industries which actually suggest that lower rather than higher skill requirements may result from full-fledged automation. As far as research in the dimensions of our problem are concerned, what these findings suggest is that we need to study not only the automating industries but the growing sectors at the fringes of the economy, many of which are conventional in their technology but which may well have to assume the major responsibility for supplying the new jobs which are needed to replace those which are not being provided in the heavily capital intensive, goods-producing, but only slowly growing sectors. It is the skill requiremnts of these "leading sectors" which need attention more than those of the more glamorous automating industries. But this discussion is already involving me in conclusions and recommendations that more properly belong at the end of my report. We can conclude for the moment that the present status of technical and vocational education is qualitatively

shaped both by a "revolution of rising expectations" with regard to occupational preparation (which is part of a broader "revolution" in educational expectations generally), and by a concern for the impact of technological change fed both by the greater availability of data and by an unsubstantiated but persistent suspicion that we are in a new industrial revolution that is qualitatively different from what we have experienced even in the recent past. The best evidence of the importance of these circumstances is the willingness of our society to devote resources to the consideration of these matters--including the resources that have made this conference possible.

II.

The next task I have set for myself is to review for you some of the approaches of the economist to the organization of technical and vocational education and the research implications of those approaches. Here the considerations we have just very sketchily reviewed--those having to do with the nature of the problem--are taken for granted and we direct our attention to what can be done about the problem.

Perhaps the most common variety of organizational approach is based on a manpower planning or "hole-and-peg" model. While these models can, as we shall see, vary greatly in complexity and analytical sophistication they all share a common characteristic: the attempt to design appropriate training patterns in order to equip the human "peg" so that it can be fitted into an occupational "hole" the existence of which is predicated upon some type of forecast of manpower needs. The simplest type is the local skill survey. One done recently in my own home county in Oregon can serve as an example. It proceeded by projecting estimates of population and labor force, by occupation and skill level wherever possible, over a five year period. This provides our "peg" information. Then local employers were sampled concerning their plans over the same period--the jobs "holes" that would be provided. The two forecasts were then matched up to reveal inconsistencies between the pegs and the holes. This information could then become the basis for policy designed to remove the inconsistencies. In the words of the survey report, its objectives are:

> "...to provide information about the occupations in the community,
>
> "...to reveal the occupations in which there is now or is likely to be either a shortage or a surplus of workers.
>
> "...to show the education and training requirements for various occupations."

I am sure that many of you are familiar with these very useful and necessary devices. Among their defects, however, two appear to be of particular importance to the economist. First, they lack "closure" on either the supply or demand side. That is, they must necessarily take the existing local situation as a point of departure. Given the considerable amount of geographical mobility of workers and industry, together with a significant range of occupational mobility, planning based upon such surveys may not only fail to close any local "gap" discovered but may also fail adequately to prepare workers for better opportunities outside the local area. They may also fail to account for "cheaper" external sources of skills required locally. The long history of local agricultural vocational training in the U.S. is a relevant case study. Second, even if "closure" could be obtained by broadening the scope of such studies, the methods employed are too simple to achieve the desired result since they abstract from the interaction between the demand and supply sides of the market. Yet the information requirements of more sophisticated models usually greatly exceed the limits of available data. W.A. Chance in a recent article (3) brings this out very clearly by attempting to construct a simple but adequate model. In his words, such a model must:

> "supply economically determined demands for different types of labor skills, and...also provide educationally determined supplies of those different skills. For the demand side of the model, a Leontief system is employed. It is assumed that, for a given future state of technology, future levels of output will reflect an optimum solution to a linear program applied to the system. The restrictions on the system are defined by the expected future composition of the labor force.

The educational element in structural unemployment discussed above will be reflected in the assumption that the optimum solution will involve a redundancy for certain skills, while other skills will be in short supply. We then ask, in what way would we wish to change the future labor mix in order to gain the maximum economic advantage? The answer to this question provides us with the future demands for the various labor skills. In arriving at this answer we shall have also arrived at a new optimum solution to the linear program, reflecting the new set of restrictions imposed by the changed labor mix. Comparison of the new optimum with the old will provide us with the economic value of a policy that can supply the new required labor mix.

The supply of various labor skills to be expected in the future will be expressed as a function of the educational system through the device of a Markov chain. It will be assumed that there is associated with a given educational program a certain set or probabilities that an individual currently in the program will remain in the program throughout the current time period, or that he will leave the program to enter the labor force as a member of one of the various skill groups.

It will also be assumed that, once an individual has entered a particular skill group, he will remain in that group until the time of his retirement. This assumption of zero mobility between skill groups shows up in the model in the form of zero probabilities for movements from any one skill group to the others. With the additional specifications of the number of individuals entering the educational system during each time period and of the probabilities that an individual in each skill group will retire during each time period, the Markov chain will be completely described.

Analysis of this Markhov chain will enable us to determine the long-run supplies of the various labor skills that will be forthcoming from the educational system. It is this set of long-run supplies of labor skills which determine the constraints to be applied to the linear program solution of the Leontief system. Given the expected lag between technology and education, we will expect these constraints to lead to an optimum solution that exhibits the characteristics of structural unemployment which have been described. But our analysis on the demand side will also tell us what labor mix we should like to have in order to improve our future position.

At this point, we determine what changes must occur in the educational system--that is to say, in the various probabilities which characterize the educational system --in order to bring about the desired improvement. It will be found that a number of solutions to this question exist, and the final solution must depend upon political and social factors, as well as economic considerations. The model will have performed its function at this point, however, in arriving at a specification of the form the final solution must take."

The quotation reveals some of the gross oversimplifications required to reduce the model to manageable proportions. What Chance finally develops

in his theoretical exercise is a two good, three skill model which while logically capable of extension to n goods and n skills, is obviously well beyond the realm of practical application within the foreseeable future. Bowman's (9) warning is appropriate here: "technical virtuosity misapplied can aggravate future adjustment problems quite as readily as more sophisticated and subtle planning may ease or prevent them." What we are left with then, are attempts to generalize the much simpler hole and peg approach. Ekaus(4) serves as an example. As already noted, he proceeds by attempting to discover the actual educational requirements for different jobs and use these data to develop a vocational education "plan." He comments: "Though nowhere are there fully adequate data, one virtue of the approach is that the studies which would be required to create a good empirical basis for projection are straight forward and relatively simple...A good occupational census is necessary and, for projections, information on the occupational distribution of industries to be expanded in the future...Additional information on wastage and the benefits of education for occupational mobility should also be developed." And he concludes: "The attempt to estimate labor and education requirements directly has the virtue of suggesting a research design which would produce empirical material of immediate use in setting criteria for education."

This simpler manpower planning approach has had a considerable bogue in the developing countries. Blandy (2) draws on this experience to illustrate several difficulties. "Human investment" through education and training appears to offer a particularly attractive alternative to heavy fixed investment in expensive equipment for countries facing great pressure for economic development with very limited resources through local saving and scarce foreign exchange. While the problems the developing countries have experienced with manpower planning are exacerbated by their special circumstances, they are not always unique and, by their obvious visibility, may call dramatically to our attention similar problems which might not be so obvious in our more favorable environment. Blandy lists a number of such problems. The first we have already met although it is much more serious in the underdeveloped nations. This is the lack of statistical data of sufficient refinement in the areas of employment, occupational structure, and educational requirements for the various occupations. Lack of sufficient refinement in the data forces reliance on highly aggregated categories which can lead to serious mistakes in educational planning. The Eckaus study (4) details some of the deficiencies in the U. S. data. The census of population, for example, precisely identifies such numerically insignificant occupations as dancers and dieticians for us, while the vague category "clerical and kindred workers, not elsewhere classified" made up sixteen per cent of the 1950 labor force. His second problem category is one with which we are also familiar. In his words: "although educational planning based upon the manpower approach is properly concerned with determining, and providing for, employment opportunities, manpower targets are frequently set up in terms of social goals rather than employment opportunities." The danger he

finds here is that the optimistic assumption that those so trained will find jobs may not be realized. The "brain drain" from the less developed to the more highly developed economy is a symptom of this malady. Atomic physicists fleeing from Britain to the U.S. are replaced by physicians, moving from India to England and so forth. Inter-regional shifts within the U. S. duplicate this process with respect to local manpower planning.

A third difficulty, upon which we have already touched in discussing the Mincer study (5), is the usual tendency of manpower planning studies, in their education and training aspects, to deal almost exclusively with formal in-school education and particularly with governmentally operated education. Along with this goes an unfortunate tendency to view job training, particularly that conducted outside the formal educational structure, as a second-rate activity that can only lead to second-rate employment opportunities. While it is more serious in poorer countries with little margin for error, the mis-allocation of resources between schooling and training which can occur from this bias toward education may have some significant effect in our economy. Indeed the Mincer study suggests that this has already happened. One wonders, for example, about the special economic lesson to be learned from our high school drop-out problem. Does the error lie in the failure of the student to recognize the alleged economic payoff from his academic program or in the failure of society properly to integrate general education with adequate job preparation and job training in a context where economic policy can ultimately deliver the jobs?

Before further examination of manpower planning models relative to research needs it would be well, at this point to turn to an alternative model of educational organization that lies at almost the opposite end of the continum beginning with manpower planning. By analogy this alternative would occupy a position comparable to that occupied by the market or price system on a continum with a centrally planned economy on the other end. In other words, manpower planning models, in their pure form, proceed to job and educational decisions in much the same way that a centrally planned system of production might proceed to decisions on the kinds and quantities of goods and services to produce. To complete the analogy then, what would the un-planned system for vocational and educational choice look like? Essentially such a system would rely almost entirely on the adjustment of prices and employment levels in the various labor markets to accomplish the necessary "planning." On the demand side technological considerations together with the pattern of demand for final products would yield derived demands by employers for various types of human abilities along with non-human resources. On the supply side occupational choices would respond to the "net advantage" provided by various jobs, conditioned both by natural abilities and by the kinds and availability of education and training. The latter would in turn be affected by interaction with demand from prospective trainees. One compnent of such models, a component which has also been used in some of the

manpower planning models, is the rate-of-return or investment in human capital calculus. In the individualistic variant, the prospective entrant into the labor market is viewed as making his education and training decisions on the basis of an estimate of the rate-of-return over cost accruing from undertaking the investment in the specific line of occupational preparation and a comparison of that rate with those attached to alternative lines of investment. As Rivlin (7) points out: "The pay-off on investment in vocational education should not be hard to measure. The pay-off to the individual is in the form of higher wages than he would have earned without the training." If the investment in human capital approach is used in social decision-making as part of a manpower planning program it would simply place the same information in the hands of the planner. As Rivlin notes, the individual's higher wages, since they are a reflection of his higher productivity, also measure the increase in national output attributable to his vocational education:

"If we have information on earnings at successive stages of life of similar persons with and without vocational training we can use this information to compute a rate of return on vocational training. A high return -- relative to other investments -- indicates that expansion of vocational training would be a productive use of resources. A low rate is a signal for retrenchment."

"Clearly it makes little sense to compute rates of return on training in general. Even if we knew that workers in general were receiving too little training we would still need to know which particular types of training most need to be expanded. What we need for planning purposes are estimates of rates or return on costs of training in particular skills or groups of skills.

To proceed any further in this digression on the social planning applications of rate-of-return analysis would lead us to add several more problems and difficulties to the list we have already built up in connection with our previous discussion of manpower planning. Rather than to go further in that direction, it would be useful to return to the individual choice model and indicate its strengths and weaknesses before we proceed to some general conclusions.

In criticizing manpower planning models we pointed out that all but the most sophisticated tended to abstract from the interaction between the demand and supply sides of the labor market. The individual choice model goes to the opposite extreme and places almost the entire burden of adjustment upon that market interaction. In other words, given adequate information, adequate access to opportunities, and a reasonable degree of competition in markets, price and quantity adjustments should be capable of eliminating labor shortages and surpluses as well as appropriately adjusting the kinds and quantities of vocational preparation.

The contrast between the individual choice and manpower planning approaches is reflected in the controversy during the past few years over the nature of unemployment. Is it simply due to inadequate aggregate demand

or is it, on the other hand, "structural" or a result of a breakdown of the ability of individualistic market interaction adequatley to allocate our labor resources in the face of rapid technological change and final demand shifts?

This controversy is critical for our discussion today since the "structural" unemployment argument provides a much stronger reinforcement for vocational education. Rivlin states the issues succinctly:

"Where unemployment is truly structural it is clear that vocational education facilitates reemployment. The exhaustion of a natural resource, the migration of a plant or an industry, a shift in technology, or a fall in demand for a particular product all may leave workers without marketable skills even though jobs are available in expanding areas or industries. Public subsidies of vocational training, together with public subsidies of the costs of moving and searching for work may be urgently needed and may be cheaper than welfare, relief, or artificial subsidy of a declining industry.

But where demand for labor in general is inadequate, it is hard to see how vocational education by itself can do much more than spread the unemployment around. It is true that unemployment rates are generally highest for persons with the least skill and education (vocational or general). Moreover, recent studies show that people with very little education are considerably less likely to be unemployed if they have had some formal vocational training. It is also true that vocational training can be shown to lead to reemployment for a substantial proportion of the unemployed workers who get it. But it is hard to know how many would have found employment anyway and how many displaced other workers with less training who would have had these jobs."

In this connection, the remarks already cited from the report of the National Commission on Technology, Automation and Economic Progress (8) are clearly relevant. These also constitute an optimistic appraisal of the potentialities of the individual choice model, providing that aggregate demand is maintained at satisfactory levels.

III

So far we have tried to indicate how the economist views the problem of technical and vocational education and to roughly sketch out some more generalized approaches to the economic organization of such education and training activities. It is now time for a summing up, for some attempt to appraise the alternative before us, and, hopefully, for some more explicit indication of the implications of all this for research in vocational and technical education.

First, on the matter of the appropriate economic organization of occupational preparation, the easy way out may also be the wise way--to be eclectric and avoid the dangers of an extreme committment to any one

solution. In spite of its indicated optimism toward the potentialities of competitive markets, Technology and the American Economy (8) states the argument for additional planning quite well:

> There is ample justification for increased education and training efforts. Quite aside from the purely personal cultural aspects of education, the level of training and skill affects the overall efficiency of the economy and the flexibility of the labor force, as well as the relative place in line of labor force members. In recent years, economists have produced evidence that the rates of return for investment in education are comparable with those earned on other investments. And cost-benefit analysis of training programs under the Manpower Development and Training Act has shown that the strictly economic returns alone were large enough to pay for the investment.

These views are echoed by Alice Rivlin:

> Part of the unemployment in a growing and changing economy is presumably always "structural" and this part may be reduced by training programs. Upgrading the labor force certainly contributes to productivity and growth. More over, simply spreading the unemployment around may have important benefits in itself. Prolonged unemployment is demoralizing and the concentration of unemployment in certain groups (e. g. Negroes) leads to hopelessness and serious social problems.

At the same time both sources are cautious with regard to attempts at comprehensive manpower planning. Rivlin stresses the dynamics of technological change and its impact on the best projections: "The longer the time horizon and the more rapid the technological change, the less reliable manpower projections become." She goes furthur, to speculate that unreliability in projections of specific manpower needs may be one of the prices we pay for technological change in a free-market economy, although she tempers this by her suspicion that reliable longrange projections of skill needs may not really be as necessary as is sometimes supposed. The President's Commission, although strongly supportive, as we have seen, of occupational training, also feels compelled to make the following distinction:

> The individual's education and skill are important determinants of his relative ability to compete for jobs. The education and skill of the labor force is important to the economy's viability. Technology determines, in part, the skills required and the educational component of those skills. But the availability of skills and the educational level of the labor force are also determinates

> of the technological changes which occur. Together, education, skill, and technology, along with other factors, determine the structure of employment and unemployment. They do not determine the level of either. (My italics)

In this endless circle of action and interaction, in which the best we can say is that everything depends upon everything else, it appears that organized planning for technical and vocational education and training cannot play the dominant role. This is not to say that it is not important or that research needs do not exist. Given this role, what tasks seem especially important to the economist? Many research agendas are implicit in what has already been said but a few can be made more explicit. In addition to what is to follow, a careful reading of Rivlin's paper would be useful as well as a look at Mary Jane Bowman's encyclopedic survey of "The Human Investment Revolution in Economic Thought" which became available too late for full consideration in the preparation of this report.

A rather unglamorous but essential type of need ought to be first on any list coming from an economist. This is the need for more and better data on the various phases of vocational and technical education and on its results. Without such data none of the questions raised by the more abstract analytical studies, of which economists are so fond, can be answered nor can reasonable strategies for application be developed. For example, we need data on the costs of training and on the income and employment histories of trainees for very specifically defined occupational categories. Only with such data can the potentialities of the rate-of-return approach for planning be realized. Uses of the technique to date have been marred both by excessive aggregation and by reliance on census data which, though admittedly better than those available in other nations, still forces us to impute the income experience of those in past cohorts to those just entering the education-training-work process. Along with this we need better data which can shed light on the issue of "general" versus "specific" job preparation. This in turn relates to the problem of transferability of skills which also calls for data. Rivlin mentions the complaint of educators to the effect that they don't want short-term projections that can only lead to training students in skills that will be obsolete in ten or fifteen years. They ask instead, according to her, for information about the skill requirements of the 1980's arguing that, "if the economists can't tell us this, we had better abandon attempts to teach specific skills and give only very general training." Rivlin's own conclusion is that "it would certainly be fun to have a good crystal ball, but I am not sure it would change curriculum decisions as much as these educators think." She then states the critical issues for research very specifically: "It is not obvious that it would be economically more advantageous to train for the skills of the 1980's right now than to train for present skills and retrain later. It is also not obvious that a man who has one skill is less able to learn one than a man with general background. We need much more research on the transferability of knowledge and skills...Educational

planning may be improved if we can accept the idea that periodic retraining is normal and desirable."

Even if we succeed in getting the kind of data we have been discussing and conclude that the current emphasis on the expansion of job preparation and training is valid, it appears that the difficulties inherent in comprehensive, long-run manpower planning as well as our traditional political realities are likely to limit our efforts to relatively short-range, locally administered programs. This still leaves many questions to be answered. If we are to increase our efforts; what kind of training activities should be expanded? Should they be included in our formal schooling or outside of it, either in private or industry-run efforts or on-the-job? How should the costs be shared among trainees, firms, and tax-payers? All these questions call for research efforts. Revlin states the issues well:

> In the realm of general education any debate over the existence of public schools has an aura of fantasy and is not taken seriously by practical people. It is impossible to point to any country which has achieved a high level of literacy and general education without compulsory attendance laws and free public schools. One can, however, find industrial countries with high growth rates and low unemployment in which training for work is conducted almost entirely outside the public school system. Germany, for example, relies mainly on an elaborate system of apprenticeships and company training programs for students who have completed the required amount of general education in school.
>
> In the United States we have considerable experience with alternative types of training for work. Vocational courses have been a regular part of secondary school curricula for many years. Cooperative programs have been tried in some occupations and in some school systems. Formal apprenticeships and company training programs are usual in some occupations and less formal on-the-job training in others.
>
> Yet almost none of this experience has been analysed with a view to assessing relative cost and effectiveness of alternative systems. At present there is little basis for answering the question; what kinds of training are most efficiently done in schools, which on the job and which in cooperative programs? One can only point to some general considerations...

On the question of who should pay, we need first of all to find out who does pay. While it would seem that if training takes place on-the-job the employer pays; if it takes place in private schools the trainee pays; while if it takes place in the public schools the taxpayer pays, things are not that simple. Here rate-of-return analysis, with its emphasis upon opportunity costs and foregone earnings, has shed some light but more is needed. If we decide that some form of subsidization is desirable in the interest of overcoming economic barriers to the optimal investment in training, we still have to decide what kind of subsidization is desirable in the interest of overcoming economic barriers to the optimal investment in training, we still have to decide what kind of subsidization and how much. The rationale for subsidization, if there is one, does not point unequivocally at heavy reliance on traditional vocational education in the public schools either in the high school or community college. If on-the-job training or courses offered in the plant or on the work site appear to be more efficient, we should seek means to subsidize them directly. Where support is limited to the public schools and where it is primarily local, special problems arise. As Rivlin says, "Communities may be unwilling to support training for jobs which can only be found elsewhere. Hence local support and local decision-making may lead to substantially less investment in training for work than would be undertaken if decisions were made (or incentives offered) by some larger unit. The large amount of migration of American young people makes it imperative that we find ways of transmitting the skill needs of one area to the curriculum planners of another."

I fear that I have suceeded both in talking too long and raising many more questions than I have answered, but before I stop I should recognize to a greater extent than I have, the inherent limitations of the economic approach . The problems of technical and vocational education are clearly linked with many of our most pressing social problems: the urban ghetto, the rural depressed area, the apparent discontent and alienation of our youth, and many more. Analysis based solely on costs and returns, if it is not carefully designed, can overlook other social values, yet it need not do so. Cost-benefit or cost effectiveness analysis is not inherently limited to those values with an explicit price tag attached. Still, the economist is not always, or even usually, in a position to give these non-monetary aspects their proper weight. In this day of popularity of the economic approach it is your responsibility to understand something of what the economist is doing, if only to ensure that his analysis has sufficient breadth. On the other hand, it is the economist's special responsibility not to push his analysis too far unless it takes proper note of broader social implications. Mary Jane Bowman (9), speaking of attempts at comprehensive economic planning of education puts this point well and provides me with an appropriate closing statement:"So far as formalized solutions are concerned, there is an evident bias toward consideration of the more easily measured variables and criteria of evaluation -- hence, typically, toward the economics. On the other hand, as most recent efforts attest, the non-economic variables that enter as constraints can easily dominate the solutions. Under such circumstances the economic aspect of educational planning comes to be a posting of what the non-economic constraints are costing a society."

Brief Biliography on Economics and Vocational Preparation

(1) Becker, Gary S. Human Capital (New York, National Bureau of Economic Research, 1964), Especially Part One.

(2) Blandy, Richard; "Some Questions Concerning Education and Training" Review of Economics and Statistics, May 1964.

(3) Chance, W. A.; "Long-term Labor Requirements and Output of the Educational System," Southern Economic Journal, April 1966.

(4) Eckaus, R. S. ; "Economic Criteria for Education and Training" Review of Economics and Statistics, May 1964.

(5) Mincer, Jacob; "On-the-job Training: Costs, Returns, and some Implications," Journal of Political Economy, October 1962, Supplement.

(6) Raimon; "Changes in Productivity and the Skill-Mix," International Labor Review, October 1965.

(7) Rivlin, Alice M.; "Critical Issues in the Development of Vocational Education," Reprint 112, The Brookings Institution.

(8) U.S. National Commission on Technology, Automation and Economic Progress, Technology and the American Economy, Vol. 1, February 1966.

(9) Bowman, Mary Jane; "The Human Investment Revolution in Economic Thought," Sociology of Education, Spring 1966.

REQUIREMENTS OF AN EFFECTIVE RESEARCH STRATEGY

Robert Campbell

1. Data without hypotheses or hypotheses without data are not research (though both can be useful). In our hypotheses we postualte plausible relationships among variables which we then try to discover in the data.

2. Other things being equal, data already available are better than data which must be expensively (and often unreliably) developed from scratch.

3. Hypothese must be developed with one eye on the significant questions that cry out to be answered but with the other eye on what can be proven or disproven with data that are at least potentially collectible. Research economizing works both ways--try substituting simpler questions for which answers can be found for the really important ones which are, unfortunately, beyond our current capacities to answer (even if Uncle Sam writes a blank check for us.) On the other hand, try to stretch your data--squeeze it to extract as much information as possible. Look around to see if existing information can be related in imaginative and useful ways.

4. Experiments are fun but also dangerous and hard to control. No desk calculator ever protested to the school board about being used as a guinea pig.

5. Don't be afraid of statistics. Simple correlation or analysis of variance techniques (with some knowledge of sampling theory) will take you as far as most of us need to go. You won't need the COMPUTER either. All you need you can get out of one introductory text (with perhaps some work on your part).

RESOURCE MATERIALS FOR USE IN VOCATIONAL AND TECHNICAL EDUCATION RESEARCH

By Kent Wood

We are in the midst of a scientific and technical revolution. We might add educational revolution as well to this cliche. We are now taking close-up photos of the moon, walking in space and planting mechanical hearts. We are moving ahead in many technologies, including those associated with the library. Not long ago I was shocked in a recent meeting of the American Library Association to find that we have now even mastered the technology required to print a label on an egg yolk or a pile of sand. Literally thousands of pages may now be stored in a crystal no larger than a cube of sugar. Don't ask me what this means to library use today, but it means that in the future you may very well have books printed in a coin operated dispenser. A book on the subject you desire may be produced on the spot and dispensed just as you now place a coin in a machine for a package of gum. Certainly technical and vocational education is also being drastically affected.

Education is not viewed as the 'miracle pill' that will save the world, erase poverty, or resolve the many complex problems facing us today, but it is somewhat recognized as being tied to the vehicle of change and of challenge.

Plato sensed the value of vocational and technical education when he recorded the basic purpose of education as being the discovery of what each citizen was good for and training him to mastery of that area. He observed that such development would also fulfill the social needs in the most

harmonious way possible. John Dewey modified Plato's observation and determined that the key to happiness was to find what a person was capable of giving him the opportunity to do it.

Plato is identified by librarians as the father of encyclopedias because he was the first to set out to compile all the education a young man should possess. Although he never wrote an encyclopedia himself, his nephew, Speusippos, wrote several including one of natural history, mathematics, philosophy and others.

I suspect that the reason I am appearing on the program this morning is to help you find library resources in the most harmonious way possible and relate these resources, including specialized educational encyclopedias, to the research in Vocational and Technical Education. I would like to stress the importance of libraries. In a quote from a book you will find especially helpful, 'How to Locate Educational Information and Data, by Alexander and Burke, a few ideas in this regard are mentioned:

> A New York Times editorial of November 19, 1954, asked, If Western culture...were to sink into the ground except for one New York building, which one would you chose to be saved?" The editorial showed there could be no choice. The answer would have to be "The New York Public Library off 42nd Street.[1]

Another example cited by Alexander and Burke recount that Columbus died thinking he had reached Asia because he was ignorant of certain navigational knowledge. In quoting Mr. Hurchie, a former specialist navigator who wrote eleven facts that would have spared Columbus the great error, it is stated that Erathosthenes in 250 B.C. recorded the circumference of the earth to be approximately twenty-five thousand miles

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[1]Alexander, Carter and Arvid J. Burke. How to Locate Educational Information and Data. 4th ed. Bureau of Publications, Columbia Teachers College, New York, 1958, p. 3

whereas Columbus believed it to be only 3/4 that size. Phoenician seamen sailing in the fleet of the Egyptian Necho had commenced a trip from the Red Sea, sailed around Africa, and after three years of sailing arrived at the Nile Delta. South Sea Islanders had developed the skill to predict through their observation of wave action, direction, distance, etc., the shore and configurations of land far too distant to be seen, and thereby were able to navigate four thousand miles of uncharted ocean, which was much further than any voyage taken by Columbus. There were other such facts given, but the point is that had Columbus known and used navigational materials in the libraries accessible to him, he may have known that he had not arrived in Asia.

The researcher in education also must chart his course by utilization of available resources. For educators the library may well hold some unfound mysteries that may spark a new curricular development or perhaps a new research proposal, or any other pertinent compilation working ideas.

Attempting to use a library with the basic knowledge of the Dewey Decimal System as an organized system of knowledge and the card catalog as an index to the library may prove both time consuming and frustrating. A feeling of frustration may come from either finding too few library materials or being over whelmed with a mass of references, ninety percent of which may bear little relationship to the topic at hand.

In using the resources of the library, it is important to determine what questions you want answered or the type of information you are seeking. Is the question of purpose, for example, tied to statistical information or are you looking for current research recently reported, or perhaps it is a definition type question you seek the answer to. Can you imagine

a person for instance coming to the librarian and asking "Where are the library materials on Technical and Vocational Education that might prove helpful in research?" He would have no more idea of the material you were looking for than you did and could properly refer you to the whole library. Rather than that he is likely to ask you "What do you plan to do with the information" and thereby attempt to classify the question to a type. Perhaps at this point you decide you want to know a specific fact such as "How much was included in the appropriations for the Vocational Education Act of 1963?" You might be looking for another type of question such as "How is the most effective way to teach the use of the dynamometer recently donated to Utah State University?" Another type may be to determine trends in the teaching of certain Industrial Arts in the high school or what research has been done on drop-outs from vocational agriculture such as reported by LeRoy A. Stone of Kansas State University in the Journal of Educational Research, September 1965.

The first step in utilizing resource materials in the library, over simplified as it may seem, is to formulate what you are interested in locating and not just the materials on vocational and technical education.

A few helpful suggestions that will save time are as follows:

1. When commencing research, it is wise to work backwards from the present to select references. The latest bibliographies are likely to contain many of the earlier sources you might take a much longer time to locate by searching with the historical chronological method.

2. Start reading for the whole or a bird's eye view of the topic for which you are seeking information. This gives you a perspective and a feeling of confidence and mastery of materials you will not otherwise find. It may help you relate materials to your research you may otherwise

fail to use or find and gives you a better organized bibliography. Start from the general, then move to the specific areas of your topic.

3. Secure some major references that cover the important aspects of the problem before beginning detailed reading. You will find that there is much duplication and that a later reference will often summarize earlier materials saving you the time you might have spent in reading them all completely.

4. Be sure to copy all the available data on a reference when making the first copy of it. One study showed that failure of research assistants to do this cost a project 20% increase in work.

5. When unable to locate materials on the shelf, recall that they could be one of several places: on researve, in use by another person in the library, in circulation, or in the reference sections of the library.

6. Browse through the library to become accustomed to the arrangement of the materials and identify those areas you feel you will be likely to find the bulk of your materials such as the Science Division or Education Division, or etc.

7. Realize that everyone working in the library is not a librarian, and may well be only a student employee who does not ~~know as much~~ as you. Too often a person assumes ~~that~~ the person at the desk has all the required ~~training~~ to answer any question that may be asked. A sophomore or freshman library assistant may prove helpful, but it is better to ascertain the services of a librarian if you don't gain a satisfactory answer for the problem you face.

8. Be especially mindful of dates of publications. Too often persons look only at titles to find that the publications are too old to be useful to them. Frequently this knowledge comes after several frustrating

periods used to locate the material that could have been discarded much earlier if the date had been observed.

9. Realize that not all important publications are listed in the card catalog even when they are in the format of a book. Government documents are a prime example of this, and in the field of education these are especially important sources.

10. Be familiar with library terms, such as bibliography which is far different from a biography, and that the Kardex is not the Card Catalog.

11. Lastly, don't short change your research by relying only upon the card catalog. You may well find, especially for recent topics not a single item listed. Periodical indexes, bibliographies published separately, professional journals, and government publications may give you the key resource materials you need.

At this point I would like to introduce you to the floor plans of the university library. You will note on the transparency that there are turnstiles and that they turn but one way. The set to the north are for entry and those on the south are for exit. You will also note that materials are checked out by IBM punch cards that allow circulation control by computer.

As we go east on the first floor we approach the reserve room that is partitioned from the rest of the library by the glass walls. Many confuse this room with the reference room and I emphasize the reference materials are located in every section of the library. The reserve room includes materials placed there by instructors to limit the reading time of them to allow more students the use of them. Frequently this is required reading.

Also in the reserve room are the general periodicals like Newsweek, Life, Time, etc., as well as the biographies and the major portion of the 000's except for reference materials.

To check where the materials are located in the Dewey Decimal Classification system a directory is provided on each floor. Also the general Kardex is located on the first floor near the master card catalog for your aid in locating where periodical type publications are located.

Beyond the Kardex is the General Reference and Information Desk. Materials that pertain to all subject areas such as Dissertation Abstracts and others are located in this area. Educational Index, an index you will undoubtedly be referring to is located here as well as up on the second floor in the Education Division. Also duplicate copies of the U. S. Monthly Catalog of Government Publications is located here. As the prime source for locating government publications, this too will be a must in your research. It is well to note that thesis and dissertations done at Utah State University are also located in this area. If for no more than for use of these three types of materials, you should become acquainted with the General Reference Area. Adjacent to this area is the Public Documents Reference Area. Also the micro - text materials, including micro-film, micro-card and micro-print are all located here along with the readers to use them.

As we move to the second floor we enter the Science Division and with the strong tie between Vocational and Technical Education to Science, you will find some of your most helpful materials here. Up until 1958 you would find the Indistrial Arts Index to be especially helpful. If the research you are doing is for information prior to that date, this index should still be helpful. However, since 1958, the index Applied Science and Technology will be helpful, along with Agriculture and Biological Sciences Index. Both these are located in this division. Another you may find helpful for resource materials is the Engineering Index

which includes indexing of periodicals dealing with the construction arts and related materials.

On this floor you will note that there is a card catalog and a kardex for each division. A word of caution is that these only contain materials in the division and if you rely wholly upon them, you may miss sources. However, they are convenient to use when this limitation is realized.

You will note that the arrangement of materials is similar in each division. The journals and periodicals are arranged alphabetically by title on the east wall and the books run on the west side of the divisions you will be concerned with. The 500 and 600, being Pure Science and the Applied Sciences, are the first to be approached as we move through the book stacks. About midway on the second floor we reach the Social Science, Education and Business Service Desk. This marks the division and another card catalog and kardex, along the the indexes for this division are located here. Another copy of the Education Index, U. S. Monthly Catalog of Government Publications and the index PAIS (Public Affairs Information Service) are here. Also the Business Periodicals Index may prove helpful in your research. Other sources may include such materials as the Psychological Abstracts or Cyclopedia of Education. Perhaps one of the best sources to keep current with what research is currently being done in the field of education is the Journal of Educational Research. I would also suggest that Master's Thesis in Education would be helpful as might Social Science and Humanities Index. I would caution against assuming that if Vocational or Technical Education does not appear in titles, that the sources are of little value. Business Education Index for example indexes some general periodicals besides the periodicals devoted exclusively to Business Education.

Another resource that may prove helpful is the Curriculum Materials

Center that houses the various study guides, textbooks, and other curriculum materials used in public schools. A source titled the Curriculum Advisory Service, in looseleaf format, is located here and reviews the newly published curriculum materials, predominantly the textbooks. You will find a special section devoted to Vocational Areas in the Curriculum Materials Center. All the materials are organized and shelved by curriculum subject area and then by publisher rather than by Dewey Decimal. This includes the vertical file that houses the non-book materials that are not conveniently shelved.

As you leave the Education Division, you will enter the middle tier of the documents stack area. I should like to explain that the government documents are housed in this older portion of the building by Government Publication Office classification numbers. Each number is preceded by letters such as A for the Department of Agriculture, FS for the U. S. Office of Education, etc. Other numbers follow these letters such as 1.29:36. Any divisions whether a decimal or a shilling mark or a colon, etc. are divisions between whole numbers and in this way varies from the Dewey. If you have difficulty with documents it would be well to check at the documents service desk on the first level.

Later this morning we will meet in the student lounge of the University Library which is the area immediately to the north as you enter the library. It is carpeted in bright green with some hues of orange and yellow furniture. We will walk through the areas briefly that I have mentioned.

In conclusion, I should like to give a brief list, certainly not exhaustive of resources you may find helpful. I have mentioned the Cyclopedia of Education by Paul Monroe. Up to 1913, it covers education of all times and all countries. It includes bibliographies and is useful

for starting historical research. The Encyclopedia of Modern Education, published in 1943, gives concise popular treatment of basic items of interest. The Encyclopedia of Educational Research by Walter S. Monroe and published in 1950 gives critical and evaluative synthesis of the literature of educational research and is arranged alphabetically by subject. The Review of Education Research, a periodical attempts to keep this encyclopedia up to date. The Dictionary of Education by Carter is a good scholarly dictionary of some 16,000 technical and professional terms covering the entire field of education. Statistical Abstracts of the United States will prove helpful for statistical type information, although the Biennial Surveys of Education will be more appropriate for work in education. The Education Index will prove helpful along with others mentioned earlier of the journals. Remember that it will save time to check the Kardex which lists the periodicals in the library prior to looking for titles indexed. For state publications the Monthly Checklist of State Publications in the General Reference Area will prove helpful to locate educational publications issued by state governments.

I hope I have not stranded you in a maze of bibliographic materials and have accomplished the task set before me of introducing you both to resources and the university library. I'll see you again in the student lounge of the university for the brief tour of the facilities.

Now may I answer questions, if any?

Don Sisson

I. Purpose and role of the statistician

II. How to talk to the statistician

III. What the statistician expects of you

IV. What to do before and after you talk to the statistician

A. Possible adjustments in method to conform statistically to the objectives.

B. Selection of the treatments of methods, etc., to use planned comparisons, factorials, etc.

C. Consider concomitant variables (covariance, etc.)

D. Initiate and carry out the study properly

1. Define your terms (population, sample etc.) See handout.

2. Prepare questionnaires, tests, etc. properly (will discuss later)

3. Selection of subjects, teachers, treatments, methods, etc.

a. Group sampling with heights

b. Subjective selection

c. Randomization

(1). In sampling

(2). In Assignment of various units

d. Stratification

(1). Replication -- Requires both researcher and statistician.

Example: Regression and Correlation

	Grade Point	$(Y-\bar{n})$	DAT score	$(X-x)$
	2.0	-.6	80	-20
	3.0	.4	110	10
	2.5	-.1	100	0
	3.5	.9	120	20
	2.0	-.6	90	-10
Σ	13.0	0	500	0
mean	2.6		100	

$\Sigma(X-\pi)^2 = 1000$ $\Sigma(Y-\bar{y})^2 = 1.70$ $\Sigma(X-\bar{x})\ (Y-\bar{y}) = 30$

$b = \frac{30}{1000} = .03$ $a = -.4$

$Y = -.4 + .03X$

$r = \frac{30}{\sqrt{(1000)(1.70)}} = \frac{30}{\sqrt{1700}} = \frac{30}{44} = .73$

$r^2 = .53$

Model was $Y = b. + b.X. + \epsilon$

In multiple regression $Y = b. + b_1X_1 + b_2X_2 + \ldots\ldots\ldots + b_kX_k + \epsilon$

VI. Analysis of variance

Dropout vs. score on DAT test
(Dropout is treatment and we compare the means of the two groups.)

Example: Analysis of Variance on DAT score

Dropouts	Non-Dropouts	
60	80	
90	110	
80	100	
70	120	
100	90	
Total 400	500	900
Mean 80	100	90

SV	df	SS	MS	F
Dropout vs. Non-Dropout	1	1000	1000	4
Error (within)	8	2000	250	
Total	9	3000		

Sampling Methods

Donald V. Sisson

TERMS

Handout #1

1. Sample survey: The process of selecting some fraction of the population and making inferences on the total population.
2. Census survey: A special case of the sample survey where the sampling fraction becomes one, i.e., the entire population is enumerated in the survey.
3. Descriptive survey: A survey in which an attempt is made merely to describe or tell something about the population. An example would be the determination of the average height of the studentbody or the mean yield of a variety of wheat, etc.
4. Analytical survey: A survey in which an attempt is made to measure the relationship between two or more characteristics or factors, i.e., the determination of the relationship, if any, between age and numbers of hours of sleep required per day.
5. Experiment: The imposition of controls on some of the factors which are normally variables, i.e., controlling the amount of light, temperature, and moisture in a greenhouse investigation.
6. Universe: The entire set of individuals or units about which information is desired.
7. Population: A particular set of characteristics which can be observed from a given universe, i.e., the height of the students in the studentbody or the age, etc.

8. Observation unit: The unit or entity on which the observation is made. Usually each element in the population is an observation unit.

9. Sampling unit: The unit or entity which is selected, usually at random, to make up the sample. This will often be the same as the observational unit, but is not necessarily always so.

10. Frame: A complete list of all the sampling units.

11. Sample: In a broad sense, this refers to any fraction of the elements in the universe. It is usually meant to be representative of the universe.

12. Judgement Selection: Choosing the sampling units in a non-random manner or allowing your judgement in some way to affect the selection. It is also termed "purposive sampling."

13. Chance selection: Choosing the sampling units in some non-subjective manner to eliminate any conscious or unconscious bias on the part of the selector. It is also termed random sampling.

14. Estimate: A particular number or value that stands for some true usually unknown population value or parameter.

15. Estimator: A procedure or formula for obtaining an estimate from a set of observations.

16. Expected value: The average value of all possible estimates that could be obtained from a population using a particular estimator. The expected value need not be a value which is possible to obtain from any given unit.

17. Bias: The difference between the true value of a population parameter and the expected value of an estimator of the given parameter.

18. Precision: A measure of the repeatability of an estimator. A measure of the closeness an estimate lies to the expected value over repeated trails.

19. Accuracy: A measure of the closeness of an estimate to the true parameter. (It is possible, therefore, to have high precision, yet low accuracy).

20. Sample size: The number of sampling units in the sample. This is usually represented symbolically by n.

Sampling Methods

Donald V. Sisson

SOME PROBLEMS MET IN SURVEYS

Handout #2

Group I. Determination of the objectives of the proposed investigation and putting them in specific terms:

(1) the universe to be dealt with

(2) concepts, characteristics, etc. to be counted or measured

(3) to determine averages (or totals) or to examine a process

Group II. General considerations of survey design:

(1) choice of the unit on which determinations are to be made

(2) will determinations be confined to a sample or should a complete census be taken

(3) how are determinations (measurements, observations) to be made? (interview, mail, machine, human observation, etc.)

(4) funds and other resources available

(5) estimation of variance and biases

(6) estimation of costs

(7) degree of accuracy required; amount and kind of risk that can be taken

Group III. (If sampling is to be done) Sampling design:

(1) stratification (if so, what kind)

(2) choice of sampling unit (size and nature)

(3) method of selecting sampling units (probability or judgment?)

(4) method of dealing with "hard-to-get" determinations through sampling

(5) method of making estimates from the sample data

Group IV. Making the determinations:

(1) direct versus indirect methods

(2) construction of the recording form (the questionnaire, the schedule, the ballot, the diary, recording tape, etc.)

(3) method of selecting, training and controlling the investigator (the interviewer, the observer, etc.)

(4) method of dealing with "hard-to-get" determinations

Group V. Processing the data:

(1) method of treating missing data

(2) coding

(3) tabulation

Group VI. Estimation and measurement of reliability:

(1) choice of estimator

(2) exact and approximate methods of estimating confidence limits

Group VII. Examination for quality (How "good" are the results):

(1) checks-internal and external

(2) reasonableness

Group 8 Presentation of the results:

Sampling Methods

Donald V. Sisson

PRINCIPLE STEPS IN A SAMPLE SURVEY

Handout #3

1. Statement of the objectives-- A clear statement of the objectives is essential. Without it, it may be easy to become engrossed in the details of the survey and reach decisions which are contrary to the objectives. Objectives may often be classified into two main categories, the research goal and the working objectives.

The research goal is the overall aim of the investigation. It is the set of answers we are striving for with the realization that at best they may be only partially realized in any one individual survey. In experimental work this could coincide with the goals set forth in the formation of a given project under which many individual experiments are to be performed. Examples of research goals might be implied by the following questions: "What do people think of the government?" "How effective is advertising on television?", "How effective is our present system of education?", or "What is the effect of electronic computors on our society?"

The research goal may arise quite naturally or it may be the creation of the research director or even the research worker. But whether the individual research worker did or did not decide on the goal, he may well find it worth thinking about, especially from time to time as he prepares the details of his plans. We could say that the research goal determines our strategy and our next consideration, working objectives, determines our tactics.

Breaking down the research goal into a number of working objectives that can be realized in an individual survey requires abilities on the part of the research worker that might be classified as an art. It is important that the working objectives be related to the extent that the survey doesn't get out of hand in size and content. It is also important that they be specific enough to not only have an answer, but to have an answer which could be realized in the survey. In general, they should be relevant to the research goal.

As an example, consider the research goal implied by the question: "How effective is advertising on television?" Without breaking this down into specific points it would be hard to evaluate this question. A possible set of working objectives which might be realized here would be: 1. To determine how many sets are tuned into the program. 2. To determine how many persons were watching the program. 3. To determine whether or not the watchers were potential buyers or not. 4. To determine what they think of the program. 5. To see if they can identify the advertiser, etc. It may be seen that none of these working objectives answer the goal in itself, but taken collectively they could give us a good answer as to whether or not the advertising is effective.

2. Definition of the universe--This may or may not be a difficult task. In some situations there are no questions as to what constitutes the universe and the boundaries and individuals are clearly defined. Often, however, this is not the case and it may be very difficult to delineate just where the universe begins or ends geographically. In the television example it may be quite hard to tell what the range of the station is, etc.

Furthermore, it may be hard to tell whether or not an individual lying within the geographical boundaries should be considered as an element of the universe. If the universe were defined as the "civic-minded" citizens of a particular community, it might be rather difficult to judge whether a person was "civic-minded" or not. It is desirable to define the universe in such a manner that the interviewer can somehow readily ascertain whether the individual should or should not be considered a part of the universe.

3. Determination of the data to be collected--This aspect of sampling is sometimes quite vague and difficult to determine. Sometimes it is very hard to determine in advance which characteristics or measurements are relevant to our objectives. As a result we may have to make "educated guesses" or choices among a number of possible factors we could measure. It is not uncommon for researchers in this situation to measure all possible items which could conceivably have bearing on the situation. This, however, often results in burdensome surveys with data which never get analyzed. Possibly a little more thought in the planning stage could have saved the time and money involved in gathering the irrelevant data.

On the other hand, the situation often arises where the data desired is quite evident and could be measured, but due to considerations such as very high cost, etc., it is impossible to make the measurements. Here again, indirect or alternative measurements must be selected in an effort to accomplish the objectives.

As a general rule, researchers tend to take too much data, much of which is irrelevant and never gets used.

4. Methods of measurement--After it has been decided just what kinds of data are to be measured, the question arises as to just how these measurements are to be taken. Certain types of data could feasibly be obtained by a number of different methods. A number of considerations might affect the decision here. First of all, which method gives the best or most accurate results or which method gives the highest precision. Then, secondly, which method costs the least or is the easiest to obtain, etc. It might be desirable to obtain the information indirectly as in the case of certain psychological questions. Indirect methods may sometimes yield results which are equally as good if not superior to direct measurements.

5. Choice of sampling unit--Before proceeding with the actual sampling it is obvious that the universe must be subdivided into units small enough to be handled in the sample. This procedure amounts to the construction of sampling units and their size, shape, etc. depending upon the universe in question. Many times there is a wide choice in selecting just what is to be the sampling unit. For example, in deteriming the effect of advertising a certain product on television, a person might select an individual, a family unit, a household, or perhaps even a block or group of households as the unit he wishes to sample. On the other hand, there may be no choice involved at all as in the case of a survey designed to determine the average height of the studentbody. Here one almost has to use the individual as the sampling unit.

Irregardless of what the sampling units are, there are a few things which must be satisfied. The entire list of sampling units (frame) taken collectively must exhaust the entire universe. Furthermore, there

must be no overlapping of the sampling units. In other words, if an element occurs in one sampling unit, it must be impossible for it to occur in any other unit.

To illustrate, let's assume a survey has been drawn up which involves personal interviews with people. It is proposed that houses or households be selected at random and all the people in that household be interviewed. Thus, we have designated the household as the sampling unit. We must first make certain that every individual or person in the area under study (our universe) will be a member of some household. A definition of the "household" must be drawn up to accomplish this. For example, people who permanently reside in a hotel must be considered. Similarly, consideration must be given to multifamily dwellings so that each family has a chance of being sampled. If you rang only front doorbells, it might happen that you would exclude households dwelling in the second story from having any chance of being sampled, etc.

Provisions must also be made to make certain that no individual could possibly be counted as a member of more than one household. In other words, don't interview a visiting neighbor thinking he is a member of that household, as you may next go to his home and reinterview him.

6. Selection of the sample--This aspect is one of the topics primarily covered in this course and will be discussed in detail throughout our discussions. It might be well to mention here, however, that this involves such things as the actual sampling procedure, the number of samples to be taken, and other practical considerations.

7. Organization of the field work--In many small surveys, most of the planning and possibly all of the field work can be handled by one person. In others, however, the population being sampled may be very large and cover a sizeable geographic area, or the survey might be so intensive that many interviewers would be required to obtain the information. Both of the latter cases would require a great deal of planning and organization purely in the physical construction and operation of the survey. A series of supervisory offices might have to be set up and interviewers (probably within the locality of the office involved) would have to be trained. Supervision would also be required during the actual survey to make certain that the proper procedure is used, the results are accumulated correctly, and to handle unforeseen problems and "hard-to-get" responses. It would also be well to keep abreast of the results as they are obtained to ascertain whether or not the data being collected will answer the objectives of the survey.

8. Summary and analysis of the data--The procedures for analyzing the results must be planned well in advance and will vary, of course, from survey to survey. In summarizing the data, certain questions may arise however. Some of these come up during the editing of the data. An unforeseen answer may cause complications and a decision may have to be made to modify it or possibly throw it out completely. Recording errors also appear and sometimes a basic checking system can minimize this problem.

9. Information gained for future surveys--This is a rather broad and obvious topic about which much could be said. Most of the verboseness, however, could be condensed into the idea that the more information one has about

a population the better equipped one is to sample that population. It is important, therefore, that all of the information accumulated in a survey be made available and used in future work along the same line. It would also be advisable to make a note of any aspects of the survey which seemed to work especially well. Reciprocally, it is a wise man who profits by his and others mistakes, so it would certainly be wise to make special notes of those procedures and practices which did not work out well and keep them in mind for future surveys.

SOCIAL DYNAMITE IN OUR LARGE CITIES

By James B. Conant
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(NOTE: This article is a condensation of a paper presented by the author at the Conference on Unemployed Out-of-School Youth in Urban Areas, held in Washington in late May under the auspices of the National Committee on Children and Youth. The material in it is taken largely from the author's latest book, "Slum and Suburbs: A Commentary on Schools in Metropolitan Areas.")

The existence in the slums of our large cities of thousands of youth ages 16-21 who are both out of school and out of work is an explosive situation. It is social dynamite.

In preparation for the recent Conference on Unemployed Out-of-School Youth in Urban Areas, a few special studies were conducted in slum areas of large cities to find out what the facts really were. In a slum section composed almost entirely of Negroes in one of our largest cities, the following situation was found. A total of 59 percent of the male youth between the ages of 16 and 21 were out of school and unemployed. They were roaming the streets. Of the boys who graduated from high school, 48 percent were unemployed in contrast to 63 percent of the boys who had dropped out of school. In short, two-thirds of the male dropouts did not have jobs, and about half of the high school graduates did not have jobs. In such a situation, a pupil may well ask why bother to stay in school when graduation for half the boys opens onto a dead-end street?

An even worse state of affairs was found in another special study in a different city. In a slum area of 125,000 people, mostly Negro, a sampling of the youth population showed that roughly 70 percent of the boys and girls ages 16-21 were out of school and unemployed. When one stops to consider that the total population in this district is equal to that of a good-sized independent city, the magnitude of the problem is appalling and the challenge to our society is clear.

Today the fate of freedom in the world hangs very much in balance. Our success against the spread of communism in no small measure depends upon the successful operation of our own free society. To my mind, there is no question that a healthy body politic necessitates a sound economy and high employment. The history of communism shows that it feeds upon discontent, frustrated, unemployed people. The present unemployment rate, nationwide, is roughly 7 percent for all age brackets, but unemployment among youth under 20 years of age is about 17 percent, or more than twice the rate for all workers. These young people are my chief concern, especially when they are pocketed together in large numbers within the confines of the big-city slums. What can words like "freedom," "liberty," and "equality of opportunity" mean to these young people? With what kind of zeal and dedication can we expect them to withstand the relentless pressures of communism?

A youth who has dropped out of school and never has had a full-time job is not likely to become a constructive citizen of his community. Quite the contrary. As a frustrated individual he is likely to be antisocial and rebellious. He may end as a juvenile delinquent. No one would claim that providing full employment for youth in the large cities would automatically banish juvenile delinquency, for we all realize that the causes of this problem are complex and there is no one solution. However, I suggest that full employment would have a high salutary effect. Moreover, I offer the following hypothesis for professional social workers and sociologists to demolish: that the correlation between desirable social attitudes (including attitudes of youth) and job opportunities is far higher than between the former and housing conditions.

Consider for a moment the long-run consequence of the persistent failure of underprivileged youth to find work. Leaving aside the human tragedies involved in each individual instance and looking at the matter solely in terms of the welfare of our free society, one sees the special position of the large-city slums. Three factors are significant: first, the total size of the group of youth to whom I am referring--the larger the group, the more dangerous; second, the density of the population--the number of frustrated youth per block; third, the degree of isolation of the inhabitants from other kinds of people and other sorts of streets and houses.

Youth in the Slums

The youth in the big-city slums dwells in the midst of a mammoth social complex. The surrounding city extends for blocks and blocks. The business and industrial areas hem in the impoverished youth. In the case of the Negro, added to all the negative influences of a slum is the absence of any evidence that there is a pathway out. In spite of the high mobility of the family unit or perhaps because of it, a tone is set by constant talk and the prevailing attitude of the older people. And the tone is not one to encourage education or stimulate ambition. The unemployed floaters on the street are evidence to all the youth that nothing can be accomplished through education, that the door of the neighborhood schoolhouse indeed opens on a dead-end street.

In my opinion, there is no reason why this should be the case. I know there are those who maintain that, on the average, Negro children are inferior to white children in academic ability. I have seen no evidence to support any such contention. In considering the relative abilities of white and Negroes, let us examine the situation in an all-white slum in a city of considerable size. A careful study of a group of children in grade 4 of one such school showed that their average achievement level was a full year below their grade placement--a typical situation in any slum area.

What the teachers in this school have to contend with is shown by a report from the principal.

When a residential area composed of large, old homes formerly occupied by owners and single-family groups changes, economically and socially, conditions of general deterioration begin. Absentee owners rent the property by single rooms or small so-called apartments of two or three rooms to large families . . . Such

conditions attract transients (who either cannot or will not qualify for supervised low-income housing), the unemployed, the unskilled and unschooled, and the distressed families whose breadwinners have either just been committed to prison or mental institutions or who have but recently been released from such. The only possession most of these families have is children. . . . In such an environment all forms of evil flourish--the peddling of dope, drunkenness, disease, accidents, truancies, physical, mental and moral handicaps, sex perversions involving children. . . .

The parents of at least one-third of the children are either in penal institutions, or on probation, or have prison records. At least 100 children are on probation to the juvenile court. There has not been a day since I've been at the school that there has not been one or more children in detention at the juvenile court. . . .

Unless a school is able to educate its children so they may become competent and responsible citizens, its work is a temporary stopgap that relieves immediate suffering only. Although the school is the only organization that has instruction as its primary responsibility, when a noble-hearted teacher faces a barefoot, hungry, sick, distressed child, the result is an endless chain of efforts to relieve such a child.

We realize that little or nothing can be done for or with the parents of the children who face such serious problems in their homes. These problems directly affect the child's health, attendance, emotional and personal adjustment, his learning and his progress (or lack of it) in every respect. In all probability at least one-half of our children will be school dropouts. In our opinion the children need desperately, for desirable development, in addition to good schools--good homes, churches, and communities.

This official report in acknowledging the generally low achievement of the white children in this school, makes the interesting statement:

There is no reason to believe that these students as a group are inherently or genetically less capable than average students, but apparently because of some types of experiences in their lives they have been unable to develop their intellectual skills.

The belief expressed in the first part of this sentence can hardly be based on anything firmer than an assumption as to the genetic uniformity of white children whose ancestors have for several generations lived in the United States. Such an assumption, of course, leaves out of account the possibility of a selective process occurring over the generations as some tended to move to one type of occupation and settle in one type of community. However, since I see no way of investigating the role of selective migration, I should be inclined to let the assumption stand unchallenged. Only I would argue strongly that to date we have no evidence to indicate that the assumption should not be broadened to include both white and Negro students.

All the contrary evidence, namely the poor work in school and low scores on tests made by Negroes, is based to a large degree on the performance of children in what are essentially slum conditions. Consequently, I start with

the belief that, given a satisfactory socioeconomic background and educational opportunity, Negro children can be just as successful in academic work as any other group. Dramatic success has been achieved in more than one instance in raising the aspirations and achievement levels of slum children.

A Racial Problem

True, big cities have always had slums. In the United States it has been possible for people to raise themselves by their own bootstraps in the course of a generation. Why be alarmed about the present situation? First and foremost is the fact that in the past most of the inhabitants of slums were recently arrived white foreign immigrants. They knew that their predecessors for generations had worked their way out of poverty in the cities. They were convinced that they could do likewise. The almost complete lack of such conviction--aconsequence of the tragic story of the Negro in the United States--is the outstanding characteristic of youth in the Negro slum. Secondly, a foreign immigrant came from an impoverished but stable society, for the most part a peasant society with its own ancient mores. The pride of family and often strong church connections were social cement that kept the slums from being complete jungles. Lastly, labor shortages rather than labor surpluses were characteristic. Particularly, unskilled laborers were in demand. When this was not so, as in the depression years, organized society had to step in on a large scale to bolster up the tottering social structure. Today, automation has affected the whole employment scene; there is much less demand for unskilled labor. Racial discrimination makes unemployment chronic for the Negro male North and South.

In short, neither in terms of the kinds of people involved nor in terms of the economic and social setting is there much resemblance between the slum districts of 1900 and those which are the sore spots of our modern cities.

What was especially shocking to me in my visits to the large cities in the last school year was the discovery that the employment of youth is literally nobody's affair. To be sure, there are groups concerned with various aspects of the problem, but no single agency in any of the cities has the data as to the unemployment picture in that city. There is little up-to-date information about youth unemployment, even citywide, and only the estimate of school people about the slum neighborhoods. Seldom are figures available to distinguish between the unemployed who are high school graduates and those who have dropped out of school before completing the 12th grade. Most important, it is not possible to say with any accuracy how the unemployed youth are distributed among various neighborhoods and among various minority groups.

The problem of unemployed youth in the large cities is in no small part a Negro problem. We do not facilitate its solution by trying to find phrases to hide this fact. And it is largely a Negro problem in the North because of the discrimination practiced quietly but extensively by employers and labor unions. In an effort to overcome this unjust and nationally dangerous discrimination, people must not shrink from publishing statistics, unpleasant as they may be. How can we improve a situation if we are deprived of knowledge of what the situation really is?

I should like to explain how I became concerned about the social problems of the big city. The subject of my first report, "The American High School Today," was the widely comprehensive high school found in independent cities that were not part of a large metropolitan complex. However, in conjunction with my study last year of junior high school education, I decided to take a more detailed look at schools in metropolitan areas -- at schools in slums and suburbs.

In the large metropolitan areas of New York, Philadelphia, Detroit, Chicago, St. Louis, one has no difficulty in locating examples of both. In some cases a 20-minute drive will enable a person to go from one to the other. A visit to the high school serving each community will open the eyes of a visitor to the complexities of American public education. Their basic problems are quite unlike, and these differences spring from the differences in the nature of the families being served.

One lesson to be drawn from visiting a well-to-do suburb and a slum is all important for understanding American public education: to a considerable degree what a school should do and can do is determined by the status and ambitions of the families within the community. I drew this conclusion after either my staff or I had visited metropolitan schools in and around many of the largest cities in the Nation -- New York, Los Angeles, Chicago, Detroit, Philadelphia, Baltimore, and St. Louis.

Contrast in Suburbia

In the suburban high school from which 80 percent or more of the graduates enter some sort of college, the problems are the reverse of those in the city slums, where as many as half the students drop out of school prior to graduation. The task with which the school people must struggle in the city slum is, on the one hand, how to prepare the youth for getting and keeping a job as soon as he or she leaves school and, on the other hand, to encourage those who have academic talent to aim at a profession through higher education. The task thus stated seems simple. In fact, the difficulties are enormous. I am not nearly so concerned about the plight of the suburban parents whose offspring are at present having difficulty finding places in prestige colleges as I am about the plight of parents in the slums whose children drop out of school or graduate without prospects of employment. The latter is a much more serious social phenomenon, and too little attention has been paid to it.

Visits to a wealthy suburb and impoversihed slums only a few minutes away jolt one's notions of the meaning of equality of opportunity. On the one hand there is likely to be a spacious, modern school staffed by as many as 70 professionals for 1,000 pupils; on the other hand, one finds a crowded, often dilapidated and unattractive school staffed by fewer than 40 professionals for 1,000 pupils. Expenditure per pupil in the wealthy suburban school may be as high as $1,000; it is less than half that in the slum school. To my mind, in view of the problems one finds, conditions in the slum school necessitate more staff and more money than in the suburban school.

Leaving aside the suburban communities, I should like now to point up some of my observations in the slums of the large cities we visited. In each of these cities, one can find neighborhoods composed of various minority groups. Many of these are areas now designated as "culturally deprived" or "culturally different," but in my youth they would have been more simply designated as "slums." The schools serving such neighborhoods have to be visited in order for one to understand the nature of the tasks which the teachers face.

The slum areas of certain big northern cities are today largely inhabited by Negroes who have recently moved from the South hoping to improve their lot. The economic changes in the South which have forced this migration are well known. The Negro is being displaced as a farm laborer, and being unable because of discrimination to obtain other employment in the section where he was born, he becomes a migrant headed North. St. Louis is said to be the first stopping point for many who make the journey, though the school people in Chicago, Detroit, Philadelphia, Baltimore, Washington, or New York indicate that their problems with the recently arrived Negroes from the South are quite as great as those which confront their colleagues in St. Louis.

The building up of a mass of unemployed and frustrated Negro youth in congested areas of a city is a social phenomenon that may be compared to the piling up of flammable material in an empty building in a city block. Potentialities for trouble -- indeed, possibilities of disaster -- are surely there.

Let me describe a slum that might be in any one of several of the large cities I have visited. The inhabitants are all Negroes and with few exceptions have entered the city from a State in the Deep South anywhere from the last month to the last 3 years. Often the composition of a grade alters so rapidly that a teacher finds at the end of a school year that she is teaching only a few of the pupils who started with her in the fall. In one school, I recall the principal stating that a teacher absent more than 1 week will have difficulty recognizing her class when she returns. The mothers move with their offspring from room to room from month to month, and in so doing often go from one elementary school district to another; I am told that resident tenements look more like transient hotels.

I write "mothers" advisedly, since in one neighborhood, by no means the worst I have seen, a questionnaire sent out by the school authorities indicated that about a third of the pupils came from family units which had no father, stepfather, or male guardian. Less than 1 percent of the parents had graduated from college; only 10 percent of the parents had graduated from high school; only 33 percent had completed elementary school; and another 32 percent did not go that far.

These Negro slums seem to vary considerably as regards the social mores. In some there are very bad gangs, with gang warfare, among the boys. There

are also vicious fights outside of school between girls. The condition in one such neighborhood was summed up to one of my staff by a principal of a junior high school who said even he was shocked by the answers to a questionnaire to the girls which asked what their biggest problem was. The majority replied to the effect that their biggest problem was getting from the street into their apartment without being molested in the hallway of the tenement. This principal went on to say that the area had a set of social customs of its own. The streets are full of unemployed men who hang around and prey on the girls. The women are the centers of the family and as a rule are extremely loyal to the children. The men, on the other hand, are floaters.

Problems for School

In some cities, New York in particular, there are also slum areas inhabited largely by recent arrivals from Puerto Rico. In these sections, the problems are similar to those I have described, but complicated by the difference in language. One hardly needs to point out that this adds one more complication to the tasks confronting the administrators and teachers in New York City schools. Add to these tasks the possibilities of interracial hostility and gang warfare between Negroes and Puerto Ricans and the resentment of both toward the whites and one has a veritable witches' brew which comes to boil with unsavory vehemence in certain schools in certain areas -- particularly among young people of junior high school age.

One needs only to visit the type of school in a big-city slum to be convinced that the nature of the community largely determines what goes on in the school. For example, I have walked through school corridors in slum areas and, looking into classrooms, have seen children asleep with their heads on their hands. Is this situation the result of poor teachers without either disciplinary control or teaching ability? No; the children asleep at their desks have been up all night with no place to sleep or else have been subject to unbelievable family fights and horrors through the night.

A principal told one of my staff that, checking into one case, after climbing six flights of a tenement he found the boy's home -- one filthy room with a bed, a light bulb, and a sink. In the room lived the boy's mother and her four children. I might add that it is not unusual for teachers in these schools to take home with them children with little or no place to go at night. It is after visits to schools like these that I grow impatient with both critics and defenders of public education who ignore the realities of school situations to engage in fruitless debate about education philosophy, purposes, and the like.

As one taecher in a slum neighborhood said to me, "We do quite well with these chidren in the lower grades. Each of us is, for the few hours of the schoolday, an acceptable substitute for the mother. But when they reach about 10, 11, or 12 years of age, we lose them. At that time the 'street' takes over. In terms of school work, progress ceases; indeed, many pupils begin to go backward in their studies!"

What Can Be Done?

What can be done to offset the demoralizing attitude of "the worst of the slums? Not much that lies within the province of the school authorities alone. Here is where the social agencies, the junvenile courts, and the churches must come into the picture.

There are clearly many areas of concern. Among the more important are racial discrimination; employment practices of labor and management; Federal-State laws, involving insurance rates and wage scales; lack of jobs, as well as changing types of employment because of automation and the necessity for more highly skilled workers; the role of the schools in preparing youth for employment, especially average and below average youth, and in helping them make the transition from school to work; the coordination of the efforts of the scools, the employers and labor unions, and the various community agencies that have a hand in promoting youth welfare; and the role of the public sector of the economy is unable to do so. All of these questions are complex and controversial.

There are those who would say that what goes on in the schools should not have any direct connection with the community or the employment situation. I completely reject this idea. The school, the community, and the employment situation are and should be closely tied together. I am not impressed by the holding power of a school as a criterion of its quality, but neither am I impressed by the argument that a boy who fails to get along in school ought to drop out. It all depends. The situation in which a boy drops out of school only to roam the streets is quite different from the situation in which a boy drops out and finds satisfactory employment. Full-time schooling for certain youths through grade 12 may be good or bad, depending upon the employment picture. What goes on in the school ought to be conditioned in large measure by the nature of the families being served, the vocational plans and aspirations of the students, and employment opportunities.

I submit that in a heavily urbanized and industrialized free society, the educational experience of youths should fit their subsequent employment. This should be so whether a boy drops out of school in grade 10, after graduation from high school, or after graduation from college or university. In any case, there should be a smooth transition from full-time schooling to a full-time job.

This is an ideal situation admittedly and one which is at present approached only in the learned prefessions and in a few instances in the occupations for which undergraduate college courses provide the necessary training. In the case of the learned professions, those in charge of the last stage in the educational journal -- the professors of law, of medicine, and those who direct the research of candidates for the Ph. D. -- have usually a sense of responsibility for their students based on their own passionate interest in promoting the best interests of their profession. Graduates of some undergraduate professional courses in some institutions are also often assisted in finding employment.

When we examine the situation at the high school level, we find quite a different state of affairs. Although in many high schools a half or more of the graduates seek employment immediately on graduation, only in a few cities does one find an effective placement service. And I make this statement without intending any reproach to either social agencies or to guidance counselors. The obligations of the school should not end when the student either drops out of school or graduates. At that point the cumulative record folder concerning a student's educational career is usually brought to an end. It should not be. To my mind, guidance officers, especially in the large cities, ought to be given the responsibility for following the post-high-school careers of youth from the time they leave school until they are 21 years of age.

Since compulsory attendance usually ends at age 16, this means responsibility for the guidance of youth ages 16 to 21 who are out of school and either employed or unemployed. It is with the unemployed out-of-school youth that I am especially concerned -- especially the boys, for whom the unemployment problem is more severe than for girls. This expansion of the school's function will cost money and will mean additional staff -- at least a doubling of the guidance staff in most of the large cities; but the expense is necessary, for vocational and educational guidance must be a continuing process to help assure a smooth transition from school to the world of work. The present abrupt break between the two is unfortunate. What I have in mind suggests, of course, a much closer relationship than now exists between school, employers, and labor unions, as well as social agencies and employment offices.

Unfinished Business

There is no question that the school people in the large cities face a gigantic task in their efforts to prepare youth from impoverished homes for useful lives as responsible citizens and productive workers. I have the heartiest respect for the dedicated men and women who with limited means and facilities are doing the best job they can to overcome the adverse influence of the home and street in the big-city slum. As one of my associates who had spent the best years of his life as principal of a suburban public high school put it, "I visited junior high schools in New York City in some of the worst areas. I expected to find blackboard jungles; instead I found schools with high morale, tight discipline, and imaginative principals and teachers," In my own visits I found similar schools in Chicago, Detroit, and St. Louis, and my admiration for what is being done in those cities is equal to that of my collegue for what he saw in New York City.

But all problems have not been solved. Far from it. Reading is the essential tool for success in school and on the job, and although in this area much has been done, much remains to be done, particularly with respect to gaining the interest of the parents in the success of their children, reducing class size, and providing for more remedial reading teachers. Decentralized administration in the big cities is surely a step

in the right direction by bringing the schools closer to the people. A new look is needed at vocational programs, especially for the below-average students who are rejected by the vocational people and academic people alike.

Many of the large cities have made attempts to prepare slow learners for work. These efforts and adult education courses, work-study programs of various sorts are all evidence of a continuing interest of the schools in furthering educational opportunities for out-of-school youth and ought to be expanded.

But much remains to be done for the future dropout to ease the break between school and job. It appears that the only jobs available for unskilled workers in the decade ahead will be in service occupations, a fact of considerable importance in educational planning.

Finally, an important obstacle in improving the education of slum children is the fact that teachers who may have taught in schools for a number of years with a certain kind of student body suddenly find themselves engulfed by slum children whom they do not understand and for whom they fail to recognize the need for changes in the curriculum. In many cases, a reeducation of the teachers becomes necessary.

In short, there is much that schools are doing, but much more that they should do. Money in many instances is the key -- remedial reading teachers, smaller calsses, and guidance counselors cost money. I have already noted the vast disproportion between the amount spent per pupil in the wealthy suburbs and that spent in the slums of the big city.

But even if the schools were to improve their services drastically, there would still remain what seems to me the crux of the situation -- the presence or absence of employment opportunity. Whereas I have indicated my conviction that the problems or Negro education are no different from those of all underprivileged socioeconomic groups, the problems of Negro employment are distinctly different. The enforcement of antidiscrimination laws has proved a most difficult undertaking. It is generally agreed that only those projects which are supported by public funds can really be operated on a truly nondiscriminatory basis. Therefore, because of the urgency of this situation, I think it is necessary for Congress to appropriate funds for public work programs to alleviate unemployment among youth 16 to 21 in the large cities. I estimate that roughly 300,000 jobs are needed.

In conclusion, let me repeat my sense of shock as I contemplate conditions in our big cities with respect to youth in slum neighborhoods. To improve the work of the slum schools requires an improvement in the lives of the families who inhabit these slums, but without a drastic change in the employment prospects for urban Negro youth, relatively little can be accomplished. I urge that our large-city problems be analyzed in far more detail than in the past and with a far greater degree of frankness. Neighborhood by neighborhood we need to know the facts, and when these facts indicate a dangerous social situation, the American people should be prepared to take drastic measures before it is too late.

THE SCHEDULE

I. Description and use
   A. Filled out by interviewer or observer as an aid to observation
   B. Notes the same items in all cases.
   C. Makes a record for tabulation purposes.
   D. Increases accuracy of the investigation
   E. Increases standardization of observations
   F. Takes one element at a time, intensifying observation
   G. Emphasizes objectivity

II. Types of Schedules
   A. Recording objective facts:
      1. From direct observation by the investigator
      2. From interviews with people who have the facts
      3. From questionnaires filled out by people in the absence of the investigator
   B. Determining and measuring attitudes and opinions
   C. Scoring the structure and functions of institutions and organizations so that they may be compared with others or with some standard.

III. Clarify the scope and purpose of the investigation
   A. This should be done in the beginning and should not be abbreviated, nor terminated until all questions have become clear.
   B. Reduce the purposes of the inquiry to specific questions.
   C. What data would yield the answers sought?
   D. Is data available? At what costs? Are costs within means? Clear up all doubts before going further.

IV. Construction of schedules
   A. Items to include
      1. Take items from the careful preliminary analysis of the problem indicated above
      2. Do not include any item unless you know how it contributes to the study
      3. Cover all possible explanantions of the behavior you wish to explain
      4. Avoid items that will antagonize the respondent and endanger securing of other information. (Is the problem researchable by means of the schedule and interview?)
   B. Make up dummy tables and see if the schedule will give the information needed to fill in the tables.
   C. Wording of the schedule
      1. Clarity. All enumerators must interpret the question the same way
      2. Provide a sheet, or manual of instructions and definitions.
      3. Avoid subjective questions where possible
      4. Questions that can be answered; yes, no, or by checking are preferred.
      5. Avoid leading questions. Memory is not altogether reliable at best.
      6. Avoid questions that require information to make computations.

D. Form of schedule
   1. Choose size of paper or card in relation to problem of handling in the interview situation, the number of items to be included, convenience in tabulation, and problems of storing.
   2. Group items in logical order which will facilitate the interview.
   3. Clearly identify each item; mark it off from others; use plenty of space; try to avoid confusion.
   4. Provide identification of the schedule, as, code number, name, place, date, so that it can be placed back in order if needed, or follow up interviews made, if necessary.

V. Instruct and train the enumerators or interviewers. This part of the investigation should not be slighted. All should be drilled on approaches to respondent, securing cooperation, practice in recording so that completeness and accuracy become habitual.

VI. Pre-test the schedule in the field and make revisions before actually administering the entire study.

VII. Editing and re-interviewing
Daily,during the course of the investigation,the completed schedules should be edited to be sure that they are complete, consistent, and filled out accurately. The chief of the field study should go over these with each interviewer. Where necessary the interviewer must be sent back for additional information.

VIII. Tabulation
   A. Punch information on IBM cards
   B. Verify the accuracy of the IBM cards
   C. Run machine counts for data to fill in the tables

At this point the material is ready for analysis, the organization of which is determined by the original thinking and theoretical orientation of the research.

A STUDY OF OPINION
CONCERNING WAYS OF AVOIDING WAR

Mail to: Washington Public Opinion Laboratory
University of Washington
Seattle, Washington

The results of this State-wide poll will be made available to people who are helping shape our long range National policies on ways of avoiding war. This is your opportunity to express your opinion in a way that will make it count. Complete this page as indicated and return it to the Washington Public Opinion Laboratory in the attached envelope.

The following are some ways that have been suggested as steps toward peace. Check the box that best expresses your opinion of the importance of each suggestion.

Some opinions on what should be done to help keep us our of war	Very important	Important	of little importance	Too impracti-cal	More likely to cause than to prevent
1. Build up friendship and understanding between the peoples of different countries. (By writing letters, exchanging students, exchanging workers, etc.).....					
2. Try to build a military force so strong that there would be little chance that any nation would dare attack us.....					
3. Spread the teachings of Christ throughout the world.....					
4. Work for the adoption of a single language for the world..					
5. Work toward the setting up on one Federal government for the whole world. For example: An organization of Nations of the World similar to that of the United States.....					
6. Use our scientific skills to find a cure for the causes of war.....					
7. Build up our protective alliances with friendly nations...					
8. Work to arm the United Nations and to disarm the individual nations.....					
9. Work for the removal of all trade barriers between nations					
10. Continue economic aid to Western Europe.....					

Which one of the ten ways above would you say would do the most to prevent wars? Enter statement no. here _____.

Which one of the ten ways above would you say would do the least to prevent wars? Enter statement no. here _____.

Any additional suggestion or comments you would care to make on the back of this page would be appreciated.

Instructions and Definitions for Interviewers

Questions:

1. Less than 12 months — under 1
   12-23 months — 1
   24-35 months — 2

   etc.

10. Answer according to persons living in the dwelling unit at the time.
11. Be sure to secure answers for both husband and wife and in enough detail to be able to classify the answers.

Reasons for moving to Claremont

1. Explain that we are interested in their thoughts about moving before they arrived in Claremont and why they chose this community. Report answers fully and clearly. Use back side if necessary.

Participation

3. Occasionally means less than 2 a month.
   Regularly means 2 a month or more.
4. Occasionally means less than 1 a month.
   Regularly means 1 a month or more.
5. Occasionally means less than half the meetings of any one or more organizations.
   Regularly means a majority of the meetings of any organization.

How to find the person to interview:

1. Locate the block to which you are assigned. Procede to the northwest corner and begin counting dwelling units clockwise around the block. Count only dwelling units that are occupied.

2. Each separate apartment, garage apartment, trailer, duplex, etc. housing a separate family is a separate dwelling unit.

3. Interview at dwelling units 1, 4, 7, 10, etc. around the block.

4. At each dwelling unit find out how many adults there are and whether the husband-wife pair is the head of the household.

5. An adult is any individual who is married, or who is 21 years of age or older.

6. At each dwelling unit in the sample interview one adult.

7. In cases where husband-wife are the head of the household, interview M or F according to which one is indicated on the schedule.

8. In dwelling units with a single adult, interview this individual and record results on a schedule not marked M or F.

9. In dwelling units with several single adults intervie w the one commonly considered to be the head of the household.

10. In dwelling units with married couple and a single adult, interview the single adult only if the couple is clearly living with this person; otherwise, proceed as in no. 7.

11. Keep a list of addresses where no one was home or where the interview could not be obtained at the time; then call back later.

Interviewer

CLAREMONT: A STUDY OF NEWCOMERS TO A SMALL SUBURBAN TOWN

Identification:

1. How long have you lived in Claremont? Years _____
2. Where did you live before you moved to Claremont?
   City _____ State _____
3. Where did you live before you moved to California?
   City _____ State _____
4. How long have you lived in California Years _____
5. Where were you born? State _____
6. In which state did you spend most of your childhood? _____
7. How many years of school did you complete? Years _____
8. Sex: M _____ F _____
9. In which age bracket do you belong?
   Under 25 _____ 46 to 55 _____
   26 to 35 _____ 56 to 65 _____
   36 to 45 _____ 65 & over _____
10. How many persons are there in your family? Children _____ Adults _____
11. What is your occupation? Housewife _____ Wife _____
    Husband _____ Retired _____
    Unemployed _____
    _____ Employed part time _____
    _____ Employed full time _____
    _____
12. Place of work _____
13. What is your religious denomational preference? _____

REASONS FOR MOVING TO CLAREMONT

1. Why did you move to Claremont? _____
   _____
   _____
   _____

	All Reasons	Main Reason
1) Moved from a crowded area		
2) Small town		
3) Near metropolitan center		
4) Peace and quiet		
5) Available houses at attractive prices		
6) To avoid smog		
7) Health		
8) Climate (other than Health)		
9) Wish to be near family		
10) Employment		
11) Wish to be near friends		
12) Good public school system		
13) Presence of the colleges		
14) Cultural facilities other than colleges		

? . . Was your main reason for moving to Claremont fulfilled? Yes ___ No ___

PARTICIPATION IN THE COMMUNITY

1. Do you have children in the public schools? YES _____ NO _____
2. Do you attend meetings of the PTA? YES _____ NO _____
3. Do you attend any Church in Claremont? NO _____ OCCASIONALLY _____
   REGULARLY _____
4. Do you go to any of the programs or events at the colleges? NO _____
   OCCASSIONALLY _____ REGULARLY _____
5. Do you go to any other meetings in the community such as, Newcomers', Bridge club, League of Women Voters, Church organizations, service clubs, cultural events outside the colleges, etc. NO ___ OCCAS. _____ REG. _____

ATTITUDES TOWARD THE COMMUNITY

1. What is your opinion of Claremont, or your attitude toward this community?

2. What is your attitude toward the public schools?

3. Does Claremont satisfy your church needs? Attitudes toward Community Church?

4. What is your attitude toward the colleges?

5. What is your attitude toward the Newcomers' Club?

6. Have you ever heard anyone refer to North Claremont as better in any way than South Claremont? YES _____ NO _____

WRITING THE RESEARCH REPORT

Reading maketh a full man, conference

a ready man, and writing an exact man.

Francis Bacon

Writing a research report is basically like any other writing, in that the intent is to convey meaning. However, while the writer of fiction is often concerned with evoking any of a variety of emotive responses, the writer of a research report is concerned with communicating cognitive meaning--that is, ideas. And, he is concerned that his writing have the same meaning for all of his readers. The singular purpose is to communicate what he intends to say about his research project. Insuring this communication must involve one in both organization--the overall pattern of presentation--and in the choice and usage of individual words and grammatical forms. What I have to say today should have some relevance to both matters.

Writing the research report does not start at the point where your data are analyzed and the need to submit a final report, or the desire to submit a journal article reporting the findings, stares you in the face. It actually begins with the writing of the research proposal. In that process, the researcher lays the foundations for his research and, therefore, for the reporting of the research. To the extent that the proposal writing is handled well, the writing of the report is expedited.

It is, in fact, true that the major categories of organization that funding agencies usually request researchers to follow in preparing proposals provide an excellent basis for organizing one's research report. For these reasons, I would like to structure much of my discussion around the points of emphasis commonly required in proposals. (Incidentally, when the time has come to prepare the research report, the researcher would be well advised to read his proposal again. Particularly if the research has been carried out over a long period of time or involved samples that were difficult to obtain or procedures that were difficult to follow, the actual research design may have departed considerably from the one proposed. Admission and justification of these departures--not covering them up--should be a matter of importance in the report.)

The Problem

Research, generally defined, is systematic study or investigation. But, study or investigation of what? The common image of the scientist carrying out his studies because he is curious is fine, as far as it goes. But curiousity is more than a desire to know; it is usually based on a perplexity about some state of affairs. There is a problem when--to use the venacular--

there is something bugging you. Funding agencies want to know what perplexity the research springs from. So, they commonly ask that research proposals begin with a statement of the problem. And, in writing a research report also, the first task is to communicate to the reader what your problem is--that is, the one leading to the research. For only by knowning the problem you are trying to deal with can the reader understand what you are doing and why, and judge for himself whether you have followed an appropriate course of research.

The statement of the problem is, for some reason, one of the most bothersome aspects of both research proposal and report writing. One can often figure out what the problem probably is by reading the proposal or report, but often it is not stated directly. Or, if a problem is stated, it often turns out that the research actually investigates a different problem. I recently read the report of a study of the characteristics that teachers, school administrators, and university professors of school administration thought essential for school administrators who would implement innovations in public schools. But the problem stated had to do with our lack of information about what makes schools lag in implementing innovations. Obviously, the study was only tangentially related to that problem.

The writer should also keep clearly in mind that the problem is not an objective; rather each objective of your research comes from the problem. Too often we make such statements as: "The problem is to find out if students in vocational education differ in scholastic aptitude from those in college prep courses." This could be the objective of a research study, based perhaps on the problem that many assumptions are made about the comparative scholastic aptitude of vocational education students, but little information is available. Or, perhaps, that vocational education students don't do as well as college prep students in some classes, but it is not known whether this is a function of scholastic aptitude.

A homey example may be in order. A person is driving his car down the street, and the engine quits running. This is the problem: The car won't run. And the objective is to find out why so as to get it running again. An immediate hypothesis would be that the car is out of gas. The procedure might be to check the gas gauge, or--if the guage registers full and there is a suspicion that it is not a valid measure--to insert a stick in the gas tank. I hope the analogy to a research problem is clear. The gas tank case is useful when you have difficulty determining whether you have stated a problem or an objective based on a problem.

The research report is, then, begun with the statement of the problem. This inevitably involves a review of the literature. For it is not enough to say that something is "bugging" you; to be a legitimate research problem (that is, one worthy of investigation, loosely translated as being worthy of financial support), the solution to it must not be already available from previous research. It is important, of course, to use your review of the literature to indicate the importance as well as the presence of the problem, although one must be careful not to belabor proving the obvious--for example, going to great length to prove that it is important that students in vocational education be able to read beyond a first grade level.

This initial review is usually the place in which the writer will want to define his key terms, as it will likely be impossible to state the problem clearly otherwise. (Some people use a "definitions" section. I am opposed to this for a number of reasons: It breaks the flow of discourse to define words out of context when it can be done as part of the narrative; a definitions section assumes that the definitions have not been essential to understanding the report up to that point; formal definitions in a separate section tend to be too formally wordy because they lack the context of the discussion.) For example, a definition of what is meant by "students in vocational education" and "college prep students" would likely be necessary in my earlier example. Some judgment of one's audience is necessary in order to determine which words should be defined. But it is probably better to take a chance on insulting a reader's intelligence by defining words with obvious usage in your field than to err in the direction of introducing ambiguity by not defining key terms whose usage may seem obvious. Helping to determine the point at which obviousness becomes ambiguity is where a critical colleague can be invaluable.

Objectives and Hypotheses

Once the problem has been clearly developed and stated, you will want to tell the reader the purposes, or (as I use the term) more specifically, the objectives of your study. To return to my previous example, the purpose may be to provide information for making curricular decisions in vocational education, with an objective being to find out if vocational education and college prep students differ on scholastic aptitude.

A common pitfall is to confuse objectives and procedures. The procedures are the means by which the objective is to be accomplished. Note that it is not an objective to administer a scholastic aptitude measure to two samples of students drawn at random from 15 high schools in Utah. Nor is it an objective to test the difference between mean scores of vocational education and college prep students, using the T-test.

The statement of one's objectives leads to the specification of hypotheses, for in most cases certain expectations will underly the research. Two preliminary points should be noted here: (1) All studies will not necessarily have hypotheses. The most obvious example of an exception is the survey type of study which involves primarily the gathering of information because it is interesting, and useful for other purposes than as data to serve as the basis for inferential statements. You might, for example, just to keep track of the state of your field, conduct a survey to find out how many students are taking various vocational education courses or to determine what type of background and training teachers of vocational education courses have. This information might be immense value in shaping the curriculum of high school students or prospective teachers, but statistical tests of probability would not likely be in order. For such studies, the statement of objectives may suffice, or the reader of the research report may be assisted by a listing of the questions which the survey was intended to answer.

It is common to talk about two types of hypotheses: research hypotheses and statistical hypotheses. Research hypotheses present the researcher's expectation for his findings. If he anticipates that vocational education students will have lower scholastic aptitude than college prep students, his research hypothesis should be stated in those terms. Statistical hypotheses are usually in the null form. That is, they state that no difference is expected. The reason, as you know, is that most of our statistical tests are set up to test departures from zero--for example, that the difference between two means is not significantly different from zero. So the statistical hypothesis is set up in the null form to help us keep clear in our minds what is being tested, and what might be rejected at the specified level of significance. Of course, the research hypothesis may also be in the null form.

A research report should present research hypotheses for the reader. Null hypotheses tell the reader nothing of the researcher's reasoning, and absence of hypotheses suggests that the study was poorly conceived. Perhaps most important of all, the research hypotheses should emerge from the researcher's review of literature. You may wish to include a review separate from that establishing the problem, and may even want to write a separate review for each hypothesis, but each hypothesis should be grounded in a discussion of what has been done before--either theoretical or research work--as a basis for prediction. Hypotheses should not be stated in bald isolation. In fact, the whole trend of the report should be accumulative. The statement of the problem should lead to the purposes and objectives and to the hypotheses, and transitions between the sections should make the progression clear.

The clear statement of hypotheses also depends on the operational definition of key terms. For example, scholastic aptitude should at this point be defined in terms of the instrument or instruments used to measure it, Definition may involve a review of literature in itself--although this review can probably best be handled as part of the problem statement. It would be desirable to discuss how scholastic aptitude is commonly defined and measured, what tests are available, which one was selected and why. The discussion of technical points such as the test's reliability may well be deferred to the procedures section of your report. This must be a matter of judgment by the writer as he strives to maintain continuity at the same time that he attempts to provide all the information needed to understand and evaluate his study.

The hypotheses may be stated formally or stated informally as part of the narrative. For example: "The following hypothesis formed the basis for this study: The mean score of students in vocational education will not differ from those of students in college prep courses on the SRA Test of General Ability." (This hypothesis obviously presumes cnnsiderable discussion of points I have just mentioned.) Or the writer might simply state: "On the basis of the review of previous related research, then, it was hypothesized for this study that the scholastic aptitude of vocational education students would not differ from that of college prep students as indicated by mean scores on the SRA Test of General Ability."

Notice that I used the word <u>hypothesized</u> in the previous sentence. Perhaps it should go without saying that hypotheses should be formulated before the research is carried out, not after the data are analyzed. If this was not

done, it is an act of scholarly dishonesty to state hypotheses in the research report as if they had been formulated prior to the research.

Research Procedures

Once you have let the reader know what problem motivated you to carry out your research, what your objectives were, and, more specifically, what hypotheses you were testing, it is time to turn to the research itself--that is, the research procedures. It is imperative that this section be handled carefully and thoroughly. While the previous sections are important for setting the stage for discussion of the research, and also provide an excellent opportunity to display your grasp of the area in which you are doing research, the adequate reporting of your research procedures is essential if others are to be able to adequately interpret your findings and apply them either to educational problems or further research.

The Sample

The first consideration will probably be your sample (Unless, for example, in a survey study you included a total population in your design. This is, of course, very uneconomical given that a properly selected sample would provide the same information.) The population with which you are concerned will probably have been spelled out in your statement of the problem. However, it would be well to specify it again at this point in the research report, and then turn to the method of selecting the sample. The writer of a research report will want to answer questions that will be in the reader's mind, such as: How was the sample selected? Or, more specifically, was it selected randomly? If the sample was a random one, what technique was used to select it (flipping a coin, using a table of random numbers, selecting a number from a table of random numbers and then picking every nth individaul from an alphabetical listing)? Was any stratification used in the selection (for example, selecting students of different ages in proportion to their representation in the population)?

Also of general importance is any attrition in the sample after it was selected. Did you, for example, exclude some subjects because you had incomplete data on them--perhaps they did not take one of your tests or were new to the school so had an incomplete school file from which to obtain information? Or, as in some studies, did you eliminate chronic "troublemakers" from your study?

Any elimination of subjects by the researcher should be noted, the criteria for elimination spelled out, the number of students involved indicated, and any possible effect on the characteristics of the sample and the generalisability of the research discusses.

The report should also note any voluntary attrition--that is, students who dropped out of the sample of their own accord--and any affect this would likely have on the results. In studies in vocational education as in other studies at the secondary school level the person who drops out of school and thus out of the study may be a particular problem. I recently read a report of

a study in programmed instruction where students using the programs were volunteers who did not need to complete the program if they did not wish to do so. Several dropped out during the course of the study. It was not very surprising when the researcher reported significant gains for the programmed instruction group as compared with the control group attending a required course.

The problem of the dropped or lost subject is, of course, analogous to the problem of the unreturned questionnaire in survey studies. Here again it is important to report not only the proportion of returned questionnaires, but any attempt to determine how nonrespondents differed from respondents and how this might have affected the results. Those who return questionnaires are often quite different from those who don't in terms of professional interest or zeal, the extent of disgruntlement or satisfaction in surveys assessing programs, or the extent of accomplishment in surveys assessing, for example, levels of educational or financial attainment. (It should be particularly obvious at this point that in discussing writing the research report, one must constantly refer to matters of research design and execution. The good survey research study should have provided for a means of following up on non-respondents to determine if and how they differed from the returnees. Of course, special efforts to guarantee participation, such as payment of a fee or followup contacts, should have also been considered in setting up the research and reported in the report.)

Unfortunately, as researchers in eduction, we often find ourselves in situations where it is not possible to use techniques for randomly selecting our subjects. In this case, it is vital that the report communicate fully and frankly how the sample was obtained. Only by doing this, can we afford our readers the opportunity to evaluate the amount of bias that may have been introduced into the study at this point. For example, were the subjects volunteers? (There is accumulating evidence that volunteers do tend to differ from those who don't volunteer on some important characteristics, for example, their authoririanism.) Were the subjects students in a vocational education class during the only period when the school band was practicing--eliminating certain types of students from the sample?

It is also especially important when working with "available" rather than randomly selected samples to describe as completely as possible the characteristics of the sample. Such description is crucial for the reader who will want to judge if your results are generalizable to his situation or who is trying to figure out why your results are at variance with those of other research. Data reported should include students' mean scores and standard deviations on such aptitude, intelligence, achievement, and personality measures as are available, as well as grade point average and such information. But also of importance is information about the student's environment--such matters as the socio-economic status of the community, level of support for the schools, what is known about the particular school in terms of type of student, curricular emphases, attitudes of the administration and teachers toward students, the geographical location of the community (both in terms of region of county and whether it is rural, suburban, or urban). Of course, if your sample is of teachers rather than of students, or if you have carried out a study comparing the effectiveness of different teaching methods, it is just as essential to describe the teachers carefully, including information on age,

education, experience, and any measure of intelligence, personaltiy, etc. that may be available.

Design

The writer of the research report, after discussing his sample thoroughly, will also want to deal carefully and frankly with the research design used to gather data to test his hypotheses. Was it a traditional experimental-control group design with pre- and post-testing? Was it a factorial design? What control variable were used and why? Were subjects matched or was covariance used?

It is important here to distinguish between the research proposal and the research report, although both should contain sections on design. The research proposal suggests what it is planned will take place; the research report indicates what, given all the exigencies of carrying out a research project, did actually take place. Were the pre- and post-tests administered according to the planned schedule? Were teachers and students assigned randomly to the experimental and control treatments as planned? What special efforts were made to control factors that might introduce bias into the research? For example, was the control group also given "special" treatment to approximate the Hawthorne Effect on the students exposed to the experimental treatment?

Again, the purpose is to tell the reader what happened--how the design turned out in practice--not to write an essay on the ideal type of design for your type of study. Your reader can understand and interpret your findings only if he knows what happened during the research.

It may seem that I am emphasizing particularly strongly the importance of letting the reader in on possible deficiencies in your study. George Bernard Shaw, in his Man and Superman, says that "the more things a man is ashamed of, the more respectable he is." Research also growns in respectability as inadequacies are not covered up, but admitted and dealt with openly.

Departures from the ideal should be justified to the extent possible. Expediency is a poor justification, but the line between what was expedient and what was impractical, if not impossible, is usually difficult to draw clearly. In general, however, justification for departure from your proposed, or the ideal, design should not lie in saying "it was easier," but in stating clearly the conditions which made it impossible or extremely difficult to do otherwise, and in discussing why the deviation should not have affected your results--if this can be done legitimately.

Remember in writing about your design, as in the rest of your research report, that what seems obvious to you may not be to your reader. The problem of what is obvious always plagues the report writer. I think it helps if one distinguishes between what may be obvious because it is common knowledge about research procedures and what may seem obvious because it is a simple research decision with which you have lived for some length of time. Examples of the first category come most readily from the reporting of the statistical treatment of data, perhaps because this is an area where many researchers feel

insecure. The selection of a level of significance for testing hypotheses and the effects of accepting or rejecting a hypothesis at a given level are often laboriously discussed, revealing not the author's familiarity with statistical reasoning, but his ineptitude at a basic level of statistical knowledge. It should be sufficient to say that the hypothesis was rejected at the .05 level without going into a detailed discussion of how this means that the results could have occurred more than 5 times out of a hundred by chance, etc. (Of course, one's audience makes a difference. If you are writing your report for someone who lacks statistical sophistication, then such matters may need to be handled in detail. But it is still probably better done in a footnote or an appendix.)

Matters that may not be so obvious to your reader have to do with your unique design. What was the sequence of learning experiences? What instructions were given the teachers? How were control students in the same school as experimental students kept unaware of differences in treatment?

Too often charts and tables are thought appropriate only for reporting the results of the analysis of data. A chart indicating the steps in the research might be very helpful to the reader, as might a table explicating the elements of a factorial design.

Tests

Another important element in your procedures is the tests themselves. You probably will have already discussed in your statement of the problem and of the hypotheses the major tests to be used. But others not directly central to the study may not have been discussed.

You will also want to discuss, if you did not do so earlier, any special procedures followed or problems encountered. For example, if gathering your data entailed using observers or interviewers, you will want to describe carefully your training procedures and your checks on the reliability and validity of the data obtained. How were your interviewers selected? Did they know whether they were interviewing "experimental" or "control" students? Were they given a carefully structured interview schedule to follow--that is, were the questions and their order specified--or were they allowed to "explore" the topic with the interviewee?

Scoring the interview presents problems similar in many respects to those involved in using any observational technique, and the writer of the research report will want to be certain that he lets his reader know how he handles them. If the interview was scored by the interviewer as he conducted it, what guidlines were provided him? If the interviews were tape recorded for later scoring, careful description of the categories used for the scoring is important. A careful treatment of their relationship to the theoretical position underlying the study is important to indicate validity. In addition, the training of the observers or scorers should be described, again to let the reader judge whether bias may have been introduced into the study via the training procedures. For example, were the observers made aware of your hypotheses

and how the categories were related to them? How did you control for any halo effect? Did the observers score interview or discussions blind--that is, without knowing which students were in the experimental group? These are representative questions, of the type the writer of the research report should ask himself as he composes.

Remember that other researchers may read your report for a number of reasons. Only one of these is to find out the results of the study that was your main concern. One of the most frequently sought types of "auxiliary" information has to do with tests. Often people will be looking at your report to see if you developed any new tests that might be applicable to their work. In this case, of course, they will be especially interested in complete reporting of attempts to establish reliability and validity. Readers will also be looking for reports of your experiences with established tests. In one study, we found, for example, that we obtained reliability coefficients as low as .00 with Cattell's High School Personality Questionnaire, even though the test manual indicated coefficients in the range from .70 up. This kind of information is extremely important not only to others contemplating research, but in interpreting your own findings. The unreliability of tests has been responsible for more than one finding of nonsignificant differences. In general, you should be able to report to your readers that you did not rely on someone else's report of reliability, but computed your own estimate using your own data.

Statistics

The writer of a research report should always discuss his statistical treatment of the data before reporting the findings. The statistics used and the reasons for selecting them should be specified. This discussion should be related to specific hypotheses, and may be put in a general section or previous to the reporting of findings bearing on each hypothesis.

It is usually not necessary to report the formulas used, unless a special one not generally available in reference works has been used. But, do specify what formula--for example, a *t*-test for correlated means--and provide a reference to where it can be found. Again, the problem is one of drawing the line between insulting your reader's intelligence (and at the same time demonstrating your own insecurity with your statistical analysis) and giving him sufficient information to understand what you have done.

Remember also to report any special treatment of your data before it was analyzed. Included here would be any pooling of test scores, conversion from raw to standard scores, or any other kind of transformation.

Report of Results

Finally, we reach what to many seems like the culmination of the report--that is, reporting the results of the statistical analysis. This part of your report should be organized around the hypotheses or questions that should have been the basis of the research. Although I have treated them as discrete

categories, the discussion of the statistical treatment used may be intertwined with that of the results. Such decisions become matters of style and clarity.

The use of tables is crucial to most research reporting, as the summarizing of data is essential. Again the keynote must be clear, unambiguous communication. The title of each table should be developed carefully to describe what the table contains. Abbreviated headings for columns or rows often cause trouble. Remember that an abbreviation with obvious meaning to you may not be so obvious to the reader. Use footnotes to insure that the reader understands.

It is unfortunate that we can rarely report the raw data upon which our statistical manipulations are based. This would take up too much space. I might add parenthetically, however, that one's responsibility for the raw data doesn't end with the completed research report. Wollins, in an article published in The American Psychologist in 1962 reported the following results of an inquiry to 37 authors of journal articles. Of the 32 who replied, 21 reported that their raw data were no longer available--misplaced, lost, or inadvertently destroyed. He was finally able to obtain data on seven studies from five authors. Recomputing the statistics, he found errors so gross in three of the studies as to change the outcome of the results reported. This is a sobering report, particularly given the proportion of studies for which the raw data were not available. One cannot help but be a little suspicious of reported findings when the raw data have somehow ceased to exist, especially now that large masses of data can be stored in little space on I.B.M. cards. There is, of course, a time limit beyond with it may not make sense to save data. But let's not cut that time too short.

There is a general problem of how much to report in one's tables. The problem is particularly great if the research report is to be published in a journal rather than in a final report prepared for a funding agency as has been assumed to this point. There is a tendency to report the results of statistical analysis without reporting even the summary statistics upon which they are based. Analysis of variance tables often report such information as sums of squares and mean squares, the F-Ratio and its level of significance without reporting the means which are being compared. As a minimum, means and standard deviations should almost invariably be reported. This is true whether the study involves a comparison between means, or is correlational. Or if the study involves the comparison of frequencies--such as we would apply chi-square to--these should be reported.

There are several reasons for emphasizing the reporting of basic summary statistics such as means and standard deviations. In the first place, the reader may want to make some further computations or check yours. The mean and standard deviation are basic statistics for many parametric statistical formulas, just as frequencies are for most nonparametric statistics. At least, they provide a basis for estimating the reasonableness of your reported results. Furthermore, without them, it is hard for the reader to understand your results. I have seen t-tests reported, giving the level of significance, but without reporting the means which were the basis of the analysis or even indicating which group's mean was higher.

Standard deviations are all too rarely reported, although they often provide more valuable information than the mean. The difference between two means is large--perhaps ten points--but not significant. Is this a computational error? Often the answer will lie in the standard deviations for the two samples, for the size of sample variance is reflected in the estimate of the population variances, as one can readily tell from looking at the formulas for estimating the population variance. Of course, analysis of variance (and in the two-group case t^2 equals F) is a directly named application of the use of variance to estimate whether the difference between means is greater than would be expected by chance. Moreover, changes in dispersion are often as important as changes in central tendency (as estimated by the mean). In fact, when curriculum investigations do not indicate a significant gain in mean score for the experimental group, changes in variation may have occurred. The experimental treatment will sometimes have a greater differential effect on students, causing greater dispersion of scores than in the control group. This is valuable information for the reader of the research report.

Underlying all of this discussion is the assumption that knowledge of means and standard deviations for your samples provides the reader with information necessary to get a grasp of your study. Marvin Dunnette suggested the converse in the April 1966 American Psychologist. He noted the absence of mundane statistics such as means and standard deviations in journal reports of research and commented: "The implication of this, it seems to me, is that many have actually failed to bother computing such statistics as means or SD's and that, further, they probably have not examined their data with sufficient care to appreciate in any degree what they may really portray." His judgment may seem harsh, but a reader can only judge your research by your report of it. Include the basic data that will allow him to get the feel of your study as well as demonstrate that you have that feel.

While complete enough reporting is important, don't include information that is of little use. For example, there is little gained by reporting intermediate computational data, such as the sum of cross products, etc. for a product-moment correlation or, as in one report I read, the sum of ranks which must be computed as a step in computing Kendall's Coefficient of Concordance: W. Always ask yourself whether the information you would like to include will help the reader generally to interpret your findings or grasp your data better.

This is a good point at which to mention the appendices to your report. If you have doubts as to whether information should be included in the body of your report, a good compromise is to place it in an appendix. In some instances, even raw data may be placed in an appendix. More usual, however, is the use of appendices for sample test items or even for complete tests, for illustrative examples of statistical computations, for tables and illustrations to help understand the body of the report. (For example, when the audience varies greatly in statistical sophistication, an explanation of the meaning of a level of significance, that is, what it means when a difference is significant at the .05 or .01 or .001 level, is often included in an appendix as it would require an overly lengthy footnote), and even intermendiate computational data may be placed in an appendix for tests of major hypotheses to provide the

interested reader a chance to see your work--for his own curiousity as well as to check your figures. All of this is optional, however, and selections of material for appendices should be made carefully. Otherwise, the tail may begin to wag the dog. Use of any appendix may also be a way to get out of working to state succinctly what should be included in the text of the report.

Perhaps the most frequent mistake in presenting the results of a research analysis, other than providing too skimpy information or using words or abbreviations with special meanings without defining them, is repeating in the narrative what anyone who can read numbers can see in the tables. Assume that your reader can and will read the tables--and prepare your tables on that assumption. Then use the written text to explain the tables--what hypothesis each relates to, briefly the kind of information the table presents, any qualifications that should be taken into account in reading the table (for example, "Remember that the data presented in Table 1 is based on a sample of students who were volunteers"), or any special notations, symbols, or abbreviations that the reader should be aware of if they are central to reading the table (even if explained in a footnote to the table). And, then, again without reiterating the whole table in writing, note any especially significant findings presented in the table.

Discussing the Findings

At this point, you have reached the culmination of the report--the discussion of your findings. These may be discussed after presenting the results of analyzing the data bearing on each hypothesis, or saved for a chapter following the one reporting the analysis. Personally, I favor the former approach as there is nothing more boring than plowing through a chapter made up of nothing but presentations of findings. I get impatient to get into a discussion of the meaning of the findings in terms of past research, the hypotheses of the study, future research prospects, and implications for practical action. This is indeed the culmination of the study, for in discussing your findings you must refer back to your problem statement and the previous research you reviewed, you must relate your analysis of data to your hypotheses, you must show cognizance of the deficiencies in your own study. The ability to do these things while pulling from the study legitimate conclusions is the mark of an accomplished research writer.

Of special concern to you at this point will be avoiding the tendency to overgeneralize. You must remember that your study was carried out with a specific sample and undoubtedly had some striking deficiencies. These must be taken into account in drawing implications, but they should not deter you. Some cautious speculation at this point is the reward for your efforts in carefully reviewing the literature and for learning a great deal by tenaciously carrying through your study.

Keep in mind, however, that any time you speculate, you are open to rebuttal. But this is part of the dialectic which moves knowledge forward. "Nothing ventured, nothing gained" applies particularly well to research and the reporting of research. Attack is not a sign that you were wrong in speculating. It may mean that you were overly confident of your findings, or that

you did go beyond the legitimate bounds of your data, or that you were not adequately familiar with the field. It can also mean that you have questioned sacred cows in your area of research. This always offends some and brings about emotional responses. It can mean that you have provoked others to badly needed thought; it may be that while you had gone as far as could reasonably be espected, your speculations stimulated someone else to a new line of thought at least in part contradictory to your own. This is the finest tribute to your own work.

I am not in favor of the "dissertation-type" summary chapter that simply repeats in abbreviated form the total study. On the other hand, a concluding chapter or section gives the writer the chance to close his report in a grand style. This chapter or section should summarize the most significant findings of the study. (Too often it is forgotten, however, that statistical significance is not synonymous with educational or practical significance. Suppose, for example, that your study indicated that vocational education students using a complicated type of auto-instructional equipment gained, on the average, 2 points more on a test for the course than did students taught by traditional methods. The variation is small and this difference turn out to be significant at the .01 level. Do you recommend that all schools change to this method of instruction? First, is a two-point difference educationally important? It is greater than one would expect by chance 99 times in a hundred, but is it great enough to indicate an important difference in the individuals involved? Is it sufficient to recommend expensive instructional changes? The answer to these questions is undoubtedly no (and we have not even considered whether the test itself was a valid indicator of desired learning or whether the average gain might not, for example, reflect tremendous gain by a few students masking a tendency by more students to not gain more or even to gain somewhat less with the new method.)

This final chapter should also pull together the author's suggestions for further research and educational practice based on his study. It should be a pulling together of, but yet an effort to go beyond, the discussion of the results of testing specific hypotheses in the previous sections of the report. Finally, it is the section in which the writer is given the opportunity to indicate the significance of his study in terms of its implications for past and future theorizing about his area of research.

At this point, the research report is often completed. However, funding agencies sometimes request an abstract of the report. This is obviously best written after the report is written. Boiling your fine multi-page writing effort down to a one-page abstract will seem a discouraging prospect at best. However, it is surprising how well one can capture the essence of the report by carefully selecting highlights from the sections of a well-organized report.

Different Publications

To this point, I have discussed writing the research report as if it were being written for a funding agency and the only limitation on length was your own judgment as to what should be included. This will often be the case. But few people who carry out research are content to let the reporting of the research rest solely on the final report. We all know that these are too

often never seen outside the funding agency. Certainly the number of copies requested is too few to allow any sort of general distribution. Consequently, the researcher usually follows up the final report by writing one or more journal articles based on it. (Sometimes a book is published, but only a small minority of research projects warrant that).

The most striking problem of writing for a journal is the lack of space. You usually must delineate your problem and present your findings within a limit of 10 to 15 double-spaced pages. This will require considerable distilling and revising from your final report. The process becomes a challenging exercise in careful, succinct expression. It also forces you to weigh carefully the various things that could be said about your research, and this is an excellent exercise in evaluation.

Your tabular presentation of data will, of course, be restricted in a journal. One alternative is to report basic data and have other tables readily available for your readers if they are interested enough to request them. Fortunately, the U. S. Government provides an agency for this very purpose. Your tables can be deposited free of charge to you in the American Documentation Institute, Auxiliary Publications Project, Library of Congress, Washington, D. C. Photocopies or microfilm of the tables will be made available to your readers upon request by them for a nominal fee (usually about $1.25). You might even want to consider depositing with ADI tables which you did not want to include in your final report because of bulk.

The problem of the format for writing the research report is often troublesome. For the final report, the basic considerations are clarity and consistency. Use headings to alert the reader to the content of the sections as he begins to read them. But use a consistent pattern of headings to indicate which sections are subordinate and which are major. Often another research report that you find clear and easy to follow can serve as your model.

The form of citations and footnotes is also a matter of clarity and convenience. Adopt a form and follow it consistently. Personally, for citations of other works, I favor the form required for publications of the American Psychological Association (see the Publication Manual of the American Psychological Association obtainable for $1.00 from the APA office at 1333 16th Street, N. W., Washington, D. C.). With this form, the writer includes the author's last name and the date of the publication in parentheses in the body of the paper with a list of references at the end of the paper or of each section, if the paper is a long one. It is a convenient form for the typist and for the writer in that adding or deleting references does not require renumbering of footnotes or the reference list. This form also provides the reader with the information necessary to identify the work referred to if he has first glanced through the list of referencs. Footnotes containing substantive comments should still be included at the bottom of the page (for the reader's convenience) or at the end of the report or section (for the typist's convenience).

Be certain that you have checked for any format requirements of the funding agency for which you are preparing the final report. Usually there are none. If you are going to prepare the report for journal publication,

before writing it, select the journal to which you will submit the manuscript. Then check several recent issues of the journal for such matters as format (what headings are used, where are they placed on the page, what citation form is used), average length of articles, writing style (some journals require a brisk abbreviated form to save space, others will allow you to be a little more wordy), whether an abstract must be submitted, etc.

If your manuscript is rejected by the first journal to which you submit it, don't be discouraged. Submit it to another journal if there is an appropriate one. Remember, however, that each journal will have different requirements for form, so you will likely have to revise the manuscript before resubmission.

Writing Style

I have discussed primarily the general types of information to be included in a report and some general writing cautions. The writing style for your research report is crucial, but not very well dealt with in this sort of a setting. Writing is a creative effort, and I cannot tell you exactly how to write. This must be an outcome of your consideration of your audience, the material you are dealing with, and of your own unique methods of expression. General statements are possible, but are not likely to have much meaning. Writing style can be improved, for example, in terms of a criterion such as clarity, but this requires discussion based on a specific piece of writing you have done.

Perhaps the most important thing you can do in preparing your research report is to avail yourself of the criticism of one or more colleagues whose judgment you respect. Ask them to read what you have written and to comment upon it--in terms of whether you have included the essential information, whether you have communicated it clearly, and whether your conclusions are justified. If you have a colleague who only has nice things to say about what you write, avoid him. Go to the person who will be frankly critical; willing to note what he thinks is good, but just as willing to point out what he thinks are inadequacies. You may not want to accept all of his suggestions, but thinking them through and making those revisions that seem called for will improve your report immeasurably. Consider yourself indeed fortunate if you have a critical colleague willing to exchange critiquing services with you.

You should anticipate going through at least two or three drafts of your report. On the first writing seek in particular criticism of your conceptualization; on a later draft seek feedback on the clarity of written expression. Don't get committed to the first draft, but plan on using scissors to cut it up to be pasted back together again. Then when it seems the report is finally ready, put it aside and forget about it (unless you are, unfortunately, faced with a submission deadline). For by this time, you will be so used to looking at the way you have said things, that it will not seem possible that there is another way. After three or four weeks, you will come back to the report with fresh insights, able to see the need for and to make improving revisions. Check to be sure that your report has had a careful typing job, as this reflects

on your own carefulness. It may also avoid errors that can cause serious miscommunication. Careful proofreading is imperative both by your secretary and you. When that task is done, your report is ready to submit.

Joel Harris summed up the central writing task fairly well in a little verse with which I would like to conclude. He was talking to a group of writers for the press, but their task of "factual" reporting is in many respects similar to that you will face as the writer of a research report.

When you've got a thing to say,
Say it! Don't take half a day . . . .
Life is short--a fleeting vapor--
Don't you fill the whole blamed paper
With a tale which, at a pinch,
Could be cornered in an inch!
Boil her down until she simmers,
Polish her until she glimmers.

EUDCATIONAL RESEARCH INFORMATION CENTER

Sandra Noall

A national information system dedicated to the progress of education through the dissemination of educational research results and research related materials.

Research information needs in education.

Educational research is a basic part of President Johnson's "...first work of these times." Beginning with the Cooperative Research Program of 1954, the Office of Education has administered increasingly broadened research programs enacted by Congress. Answers to questions which have perplexed educators for years have already been emerging and soon will increase at a rapid rate.

Information about educational organization, curriculum, methods, and materials has little value, however, unless it is made known to persons who can use it--teachers, administrators, and researchers. Recognizing that the research on educational problems is only half the job, the Office of Education also has assumed responsibility for transmitting new information to educators and administrators. For this purpose, the Office of Education has, since 1964, been developing the Educational Research Information Center -- ERIC.

What is ERIC?

ERIC is two things. First, it is a unit in the Division of Research Training and Dissemination, Bureau of Research, Office of Education. Staff members are responsible for the development and operation of one part of an education research documentation and information system. Second, ERIC represents a decentralized, nationwide network of information clearinghouses or research documentation centers, coordinated in the Office of Education. Some of these centers are located at research and development centers; others will be located at planned regional educational laboratories; and still others are or will be affiliated with colleges and universities, State departments of education, or professional and other appropriate organizations. Some are partially supported by Office of Education research funds; others affiliate with ERIC on the basis of cooperative agreements for the exchange of information, without receiving financial support.

How does ERIC operate?

Through leadership and coordination provided by the central staff and with the efforts of persons at affiliated clearinghouses or centers, ERIC is committed to acquiring, abstracting, indexing, storing, retrieving, and disseminating nationally the most significant educational research and research-related documents. Development of a decentralized system, using specialized documentation processing centers, rests upon the conviction that persons knowledgeable in a given substantive area of educational research should decide what documents are of such sufficient value that they should be distributed nationally. Thus, acquisition and selection of documents is carried out at various centers, each of which has responsibility for a given substantive field of research.

Once the professional staff at the center decides that a document has enough quality and significance to be made available to others, the document is abstracted and indexed according to classification principles developed under the direction of the central ERIC staff. The center records the abstract, index terms, and document citations on an ERIC resume form, which becomes the principal vehicle for storage, retrieval, and dissemination of documents.

The key to indexing documents for storage and retrieval is a well-developed vocabulary. ERIC therefore has organized a Panel of Educational Terminology to develop a thesaurus of educational terms. In the meantime, centers are cooperating in developing interim appropriate indexing systems.

It is important to combine at least part of the input of the various centers into one large storage facility capable of answering certain kinds of general inquiries. Each center, therefore, sends to the central ERIC unit resumes and full texts of documents having the greatest national significance. Plans presently call for an indexed announcement of all new acquisitions supplied by centers. ERIC will inform educators and research specialists of the availability of this publication.

Development of ERIC Centers.

Although it is not possible to predict how many information centers will be ultimately affiliated with ERIC, a number will be operating by the end of 1966. Consultants, professional organizations, and staff in the Office of Education are assisting the central ERIC staff in identifying the substantive fields of knowledge of highest priority for which educational research clearinghouses should be established. As decisions are made for the order in which clearinghouses should be established in various fields, the Office of Education will ask for proposals for developing a clearinghouse or ERIC center in each identified field. Specifications will be provided for developing proposals. In cases where organizations may wish to affiliate with ERIC on a cooperative basis to exchange documents, for instance, but without financial assistance, interest may be expressed at any time to the Director of ERIC.

Uses of ERIC

The basic objective of ERIC is to provide reliable, current educational research and related information promptly and inexpensively to a wide variety of audiences: teachers, administrators, other education specialists, researchers, public officials, business and industry groups, and the public. The ultimate value of the service will be measured by the degree to which users anywhere in the country can count on ERIC to inform them of the most important developments in any area of specialization in education, regardless of the place where the new developments first occured.

When announced as available, copies of documents may be obtained at nominal cost, either on microfilm or hardcopy, through the ERIC Document Reproduction Service. Presently the Service can provide 1,700 documents as support material for planning programs for the educationally disadvantaged.* Additional

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* The ERIC Document Reproduction Service is operated under an Office of Education.

educational research documents will be available through the ERIC Document Reproduction Service within the coming year as new ERIC information centers are established. Orders for material generally will be filled within five days after requests are received.

ERIC, of course, is not, nor will it be, the only source of information about educational research. It will, however, provide services that do not now exist. By doing its job well, ERIC also will contribute directly to the development and strengthening of additional dissemination programs that begin where ERIC leaves off. For instance, State or city school systems, colleges and universities, or professional organizations may use ERIC to sharpen or expand their own dissemination programs. By relying on ERIC to inform them of research developments in education, organizations can develop the necessary means -- through publications, video tape, and live demonstrations, for example-- to carry the results of research findings, particularly teachers and administrators, ERIC can effectively contribute to speedy and widespread implementation of promising research leads.

Contract by Micro Photo Division, Bell & Howell Company, 1700 Shaw Avenue, Cleveland, Ohio 44112. Orders for documents by ERIC document number should be addressed to Bell & Howell Company. Announcement of the availability of documents will be undertaken on a periodic basis by ERIC, beginning with the documents related to programs for the educationally disadvantaged.

Division of Research Training and Dissemination/Bureau of Research
OFFICE OF EDUCATION/U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

PROPOSED SUBJECT AREAS FOR ERIC CLEARINGHOUSES

1. Administration
2. Arts and Humanities
3. Community Colleges
4. Disadvantaged
5. Early Childhood Education
6. English
7. Facilities
8. Foreign Languages
9. Gifted
10. Guidance and Counseling
11. Handicapped Children and Youth
12. Learning Processes
13. Library
14. Mathematics
15. Media
16. Natural Sciences (Biological, Earth-Space, and Physical)
17. Reading
18. Small School Systems
19. Social Sciences/Social Studies

IMPLEMENTING RESEARCH FINDINGS

Austin G. Loveless

Probably no problem besets research more than does the implementation of research findings. It is agreed by most people that the values of unapplied educational research are few; the real value of educational researh is in the use of the results in improving educational practices. How and under what conditions can implementation best take place? Answers to the following questions might help in solving the problem of implementation of research findings.

1. Under what conditions can implementation best take place?
2. Whose job is it to organize and carry out such application of research findings to the educational program?
3. What are some of the reasons for the lack of implementation?
4. What are some of the guides to be cognizant of in order to implement research findings?

Creating a climate conducive to Research

Human activities, to be best accomplished, must be performed in a climate which complements its nature, and is compatible with its purposes, and the educational climate which is most conducive to research is also the climate in which the implementation of research findings can be best realized. We might then ask, what are some of the characteristics of this climate?

1. The school atmosphere should be such that experimentation is encouraged--not just tolerated. With the many unavoidable

handicaps to overcome in experimentation in the classroom the outer climate must recognize the need for experimentation and provide the inspriation needed to pursue it on the part of teachers.

2. One of the best climates for implementing research is one in which the educational program is viewed historically. Research can be most effective in solving current problems when the past is understood in relation to the present and the future. A climate of large prespective gives more freedom to experiment.
3. Educational research and its application thrive best in a climate of professional security for the researcher. When a researcher's job or profession is at stake, he will conduct little valuable research. It is generally agreed that real experimentation is best accomplished when threat, insecurity, and penalization are avoided.
4. The implementation of research is best when all research conducted has been a matter of public concern. The schools' publics deserve to know about the operation of educational research the same as they deserve to know about the expenditures in the budget of the school.
5. The implementation of the research can be made easier when the research has been conducted to solve a specific, agreed-upon, local school problem. Research in a classroom or laboratory can be done out of an urgent desire to find a solution to a teaching-learning problem.

6. The application of research findings to school problems can be best accomplished in a climate in which there is an opportunity for democratic discussion, sharing of ideas, and a machinery for making alterations in the school program.

Whose Responsibility is it to Implement Research Findings?

The school should not be considered a factory in which isolated departments can exist and function apart from other departments, it is a joint enterprise of teachers, administrators, and laymen. If this is true, then no single person should be responsible for implementation, however, we might say that if there is any one person who can most effectively block the use of research in a school system, it is the administrator. His attitude, encouragement, and support, opens or closes the doors to educational research and implementation. A second group that has responsibility to aid in the implementing research is the school board. Their vision is often the ceiling on the research activities being pursued in the school system. A third group to share the responsibility for the implementation of research results is the teachers. Every teacher whose preparation has been adequate should feel a responsibility to conduct research in his own teaching situation and make the best applications possible.

Reasons for a Lack of Implementation

We all realize that there are numerous reasons why research findings are not put into practice as readily as some educators would like. The following are a few that we might consider:

1. By its nature much educational research does not lend itself to automatic transfer to local school problems. Seldom will research findings exactly

fit a local school problem. Educational research conducted outside a local school setting is often a highly analytical treatment of a narrow delimited problem. Usually research is not broad and general enough to be laid over a specific local educational problem.

2. Implementation is often side-tracted because the performers of research are generally not the implementors of research. The specialists in research traditionally posses no obligation to guide into educational practice the findings of their experimentation and research.
3. Research findings are often written up in a formal and foreboding report that the average educator finds it difficult to ascertain what the results of the research where, and what they could or should do about it in solving their problems.
4. Often times the research findings are difficult to implement because the research was conducted under un-natural conditions--such as in laboratory schools, or in college classes, etc. If the educational research is conducted in the field where the problems originated, the application of the findings to educational practice will become easier.
5. Last, research like some many other areas or services to a school must have a staff in order to fulfill its function. It is obvious that many schools are not aware of research and are not doing anything to implement research findings because they have not employed any one to perform such a function.

Guides to Implementation

As has been implied in the proceeding section, the implementation of educational research is seldom an activity apart from the research process. The following guides to implementation may help insure greater use of research as educational improvement.

1. It is generally understood that implementation of research findings cannot generally be obtained by administrative action. It comes about as individuals and groups become convinced by facts not by decrees.
2. Implementation has proven most satisfactory where advisory councils or special committees are formed to plan the process.
3. Implementation must be planned very carefully, step by step, stage by stage.
4. The implementation process should be the concern and obligation of everyone.
5. The implementation process should be open to the scrutiny of the administration faculty and local citizens.
6. Periods of evaluation should be scheduled during the entire implementation process in which progress and problems can be discussed.

Let's get the most out of our research in vocational education by implementing the findings of research where it can help improve our educational practices.

Reference

Barnes, John B., The Dynamics of Educational Research

STIMULATING STAFF TO DO RESEARCH IN VOCATIONAL AND TECHNICAL EDUCATION

Let's look at some terms for just a few minutes. I've not had the opportunity to hear all the presenations, so I hope you'll bear with me if I repeat.

1. Stimulate means to rouse to action, as by goading, spur on; excite; invigorate.

2. Staff--well, technically that means the people you associate with every day. But, I'll have more to say on this later.

3. Research--ah, here I'm going to step on the toes of the purist, because here I include case histories, descriptions of what is being done; and experimental studies which includes "action" research and nicely designed, tightly knit experimental control studies. Some of the more sophisticated of you may be saying, "He's throwing in everything but the kitchen sink." Agreed, because we have to encourage these "staff" members to do 'research' at their level! We don't have time to give all of them a semester's course in research design.

4. Vocational and Technical Education--Here I really stub my toe, because all "education" leads to some vocation. Ordinarily, we mean that aspect of educational opportunities, which, when offered to the student, will present him (or her) as an employable, tax-paying citizen following the last educational experience. You may notice that I do not set a specific grade level because we must have "vocational educational opportunities" for the 10th grade drop-out as well as the completer of grade 14. Research in this area is like that of Mr. Winger, which you have already examined.

   Technical education is that post-high school education which places the employable person in an earning situation perhaps below the professional and above or equal to the highly skilled.

Perhaps you do not agree wholly with my definitions, but you undoubtedly agree that we do need to stimulate vocational and technical education. As Dr. Chavrid (Director of Office of Manpower Analysis and Utilization) recently said, "The recent intensification of occupational shortages in many sections of the country has again pointed up the need to develop our manpower resources to the fullest extent. The continuing economic expansion of the past few years and the added requirements of the Viet-Nam situation have cut sharply into the

available labor supply in many areas for such occupations as engineer and scientist, draftsman, health and medical technician, and skilled metal worker. At the same time, despite the recent decline in total unemployment, joblessness continues to be at relatively high levels for many groups - particularly for nonwhite and youth just entering the labor force." (2)

It must appear obvious as former Commissioner Keppel has observed, "all aspects of education are interrelated, each aspect of education is a part of the whole and no part of American education--whether by intent or indifference --can be permitted to hold or remain in a second class status." (5) Too, believe it or not, my firends, that august body known as the American Association of School Administrators finally adopted (In March of 1966) the following resolution:

> We believe that the secondary schools should recognize and develop the capacities of every person. Attempts to qualify the entire school population for college admission betray that belief in the worth of the individual upon which our society is founded. The Association believes that occupational preparation should be an integral part of our free public education system and should be available to all who enter the world of work from the public schools.
>
> We believe that the direct transition from school to work is a worthy objective and that preparation for the world of work is a necessary and appropriate function of the secondary schools. Lastly, we believe that the expansion of the vocational-technical-occupational offerings, through area occupational programs consistent with the comprehensive secondary school concepts or through other collaborative efforts among school systems, will result in educational offerings that are greatly expanded and diversified.

So, ladies and gentlemen, we seem to have a greater agreement on the necessity for stimulation of vocational and technical education than we've ever had. But, it does us little good to agree unless we know where we've

been, where we are, and where we are going. Ah-ha,--this is where research enters.

Some of you secondary people might be able to say, "we know where these people were, are and are going--our counselors know!" In a recent article Robert Tieman (who just happens to be vocational education officer for NASA) reflects that "over 95 percent of the group (NASA trainees) felt they had received little or no help from teachers or counselors in planning their careers. Many had not looked for assistance because they felt vocational or trade education was looked down upon and that "counseling was directed toward college." (8)

All right, let's assume your staff has helped students into vocational or technical training. Leo Rosen, in the January conference at Ohio State University Conference asked us, "Is Vocational Education Training for Yesterday's Job?" He said, "The more violent critics of vocational education have argued that it has failed to keep pace with changes in the economy and has thus become a moribund institution." (7) The Ford Foundation says, "One problem of vocational education is that so little is known about the payoff. What jobs do graduates of vocational and technical schools obtain? How do they utilize what they have been taught? How does their performance compare with that of high school graduate with no vocational training? To find answers to some of these questions, the American Institute for Research, located in Pittsburgh, is presently analyzing the employment histories of some 10,000 graduates of vocational programs during the last ten years, as well as the histories of about 8,000 other high school graduates, employed in similar jobs, who did not take vocational programs."

"This first nationwide study of the postgraduation employment experience of male graduates of trade and industry vocational courses shows that the majority

of vocational course graduates do not, for their first job, enter the trade for which they trained in high school. Of the young men whose first job is not in the trade studies, very few enter the trade in later years. The study reports that for 1953,1958, and 1962, only 13.4, 14.4, and 19.8 percent respectively of the trade and industry graduates held all their full-time jobs in the trade studied. The majority of the trade and industry graduates do not work in either the trade studied or closely related trades.

This gap between the trade studies and future employment raises some serious questions about the effectiveness of both vocational education and guidance. ...Any impartial observation of the data on <u>enrollment</u> in vocational programs brings one to the conlusion that vocational education has not adjusted readily to the needs of our changing economy" (7)

The time has come for those concerned to take a close look at the economic and social changes now taking place. This close look can come only through research--as I have loosely defined it before. This close look will involve consideration of:

1. Massive shifts in employment in kind, location and emphasis.
2. Presence of more women in the labor force
3. Changing technological developments, creating change and necessity of new job skills
4. Necessity of changes in our curriculum
5. Training for job families rather than specific jobs
6. Reversing the current heavy enrollment in vocational, such as Home Economics and Vocational Agriculture, to a heavy enrollment in technical education programs.

I trust that I have indicated that stimulation of research-based vocational and technical education is more than necessary--it is a national emergency. I'd like to turn now to the question: Where should stimulation of research and the research itself be done?

Purists will scream and holler (as my Grandad used to say) but we must stimulate research at every level and in every situation. Yes, this does mean at the pre-school level and in the just pre-retirement level. It means research in the school, the home, the factory, the TV station (as the recent rxciting Utah research proposal indicates). Some might say, "Come, now, Whittemore, you don't mean at pre-school leve?" Yes, I do! We have learned that many individuals reach first grade with their mind already made up as to which is the "right" and which is the "wrong" profession or occupation. Some interesting, and rewarding, work is being done using such tools as Science Research Associate's "Our Working World" for grades 1 to 3.

Research must be carried out in the areas of manpower requirements and manpower resources; in the area of automation; in the areas of manpower development and utilization (involving youth, adult workers, workers with special needs such as the undereducated, the unemployed, the minority group member, the older worker, and many others); and, of course, in the areas of institutional, geographic, occupational, and industrial mobility. That's the "where" of the research--now let's look at the "when".

The stimulation of and the actual research should have been done a long time ago. "Research in vocational and technical education (an inquiry to identify transferable skills, for example) is insufficient. Except for isolated research in university schools of agriculture, engineering, and education,

universities have not applied the full range of their scholarly resources to the field." (4) Nor do secondary schools or vocational-technical schools fare much better when we examine their research in the area. We must sadly conclude that little had been done up to the last three or four years. All right, now is the time, then, to get our research going. Lest some of us smugly say, "We'll do a nice tight research during the school year and salve our consciences," I would point out that the world of work keeps going 24 hours a day, 365 days a year (a thought here, why not involve your staff in significant kinds of research during the summer?)

Now--who should do the stimulation and who should do the research? Obviously, since you're here, you are interested in some phase of vocational or technical education. You are the ones to do the stimulation, according to the charge from Dr. Bushnell in a letter of March 11, 1966, where he says, "Stimulate and encourage occupational education research and development activities in State departments, local school districts, colleges and universities, and non-profit organizations; stimulate activities which will result in increased interest and imporved competence in research, such as encouraging pre-service and in-service training of occupational researches." (1) This charge, however, does not imply that you should do the research. The research, to be meaningful, and generalizable, should have a healthy measure of local involvement.

I mentioned before that we must overcome our limited, and limiting, view about the identification of "staff." We cannot, any longer, afford the luxury of keeping things inside the school grounds. We have to consider as staff such people as labor council leaders, representatives of all unions, and manufacturers

and business men. If we really mean what we say about going whole hog with vocational education, we can't train people and then spew them out into industry with an "approved" stamp on them. Cooperation between all segments of education and cooperation between all elements of our society is vital. A reader of this asked me, "Do you mean all?" I said, "Yes"--those people who are currently in service occupations (including even custodial) must be involved. Some of you might say, "This Vocational Education Act of 1963 does not provide for 'outsiders'." To this, I would reply, Office of Research Programs bulletin #17 states (under the heading of personnel and facilities), 1) The staff includes individuals who are skilled and knowledgeable in the type of program represented in the proposal. 2) The program provides, where appropriate, for the use of professional personnel outside of the discipline of education. So the "who" of research involves, quite literally, anyone with an idea about vocational education. Obviously, you must be the stimulator and the guider of the research.

What should be the form of stimulation? We know that the development and expansion of vocational programs at both the secondary and post-secondary levels does not mean that potential students have the freedom to choose these opportunities. There are many factors which narrow the potential student's freedom of choice such as: society's attitude regarding success; lack of information on vocational programs; limited experiences in the world of work; limited educational background; social status, parents. As an illustration of needed stimulation which fits "society's attitude regarding success," we need only look at the proposed eight state study involving all the media. Obviously you can stimulate information about vocational and technical programs;

you can stimulate the widening of experiences in the world of work and you can stimulate the widening of educational background. These are single illustrations of forms of stimulation which is limited only by your imagination.

How should this timulation be done? We can accept some excellent suggestions from Osborn's ideas in the area of creativity. We need remember that encouragement (that is, stimulation) cultivates ideation, that friends can encourage the best of emotional ideation and that experience provides fuel for the ideation. We might raise questions like these:

1. Is there a new way to use research as it is?

2. How can we adapt the research?
   What else is like this?
   Does the past offer a parallel?
   What can we copy?

3. Can we modify the research?
   Can we give it a new twist?

4. Can we magnify it?
   Add what? Time, People, Finances?

5. Can we minify it?
   Subtract what? Time, People, Finances?
   Split it up?
   Understate it?

6. Can we substitute?
   Who else instead, what else instead, another approach?

7. Rearrange?
   Other patterns, change the pace, change the schedule?

8. Combine?
   Ideas, purposes?

One word of caution here. We must base our stimulation and the resultant research on well developed hypotheses. "Hypotheses bridge the regions of science lying between observations and theories, or the observable and the unobservable...Hypothese not only serve to guide the experimenter in his precise, controlled investigations of observable phenomena, but also to extend the frontiers of science into the unknown, the abstract, by combining imaginative, logical, theoretical and methodological procedures." (3)

We cannot, just for the sake of spending both local and Federal monies in research, stimulate that research if it does not lead to solution of the tremendous problems. As Dr. Walter M. Arnold states, in a pamphlet aptly entitled The Youth We Haven't Saved, "...individual well-being and national prosperity go hand in hand. We can no longer tolerate this waste of human resources in our expanding economy. We can no longer overlook the dropouts from our schools. Every student who desires a vocational and technical education must be offered the best that our educational system can provide." I ask you--no, I demand--that you go home and stimulate research which will develop an education which will allow all students to become worth-while citizens in our world of work.

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