DOCUMENT RESUME

ED 067 494 VT 016 714

TITLE	Training Program for Teachers in the Technologies. Final Report for Fiscal Year 1971-1972.
INSTITUTION	West Virginia Univ., Morgantown. Coll. of Human Resources and Education.
SPONS AGENCY	Office of Education (DHEW), Washington, D.C.
PUB DATE	Jun 72
NOTE	129p.
EDRS PRICE	MF-$0.65 HC-$6.58
DESCRIPTORS	Annual Reports; *Change Agents; *Developmental Programs; Educational Change; Individual Development; Individualized Programs; Industrial Arts; Industrial Education; *Inservice Teacher Education; *Instructional Improvement; Leadership Training; Program Development; Program Evaluation; Regional Planning; Resource Materials; *Teacher Educator Education; Technology
IDENTIFIERS	*Northern Appalachia

ABSTRACT

To design, develop, and implement an organizational structure for inservice teacher education and provide a continuing program for inservice leadership training in the Northern Appalachia Region for education in the technologies, a teacher educator program was established for training teachers as change agents within a comprehensive "teacher center" program. To alter inadequate classroom procedures and meet other educational needs, instructional improvement was promoted by means of a flexible individualized developmental program which was problem-oriented and task-centered, and which utilized a performance-based evaluation mode of operation. Program assessment included teacher observation in the classroom, pre- and posttesting, participant performance, and open forum sessions. Included among the recommendations of this final annual report is the establishment of regional training centers to handle localized problems. Program materials are given in the extensive appendixes. (AG)

FINAL REPORT

TRAINING PROGRAM FOR TEACHERS IN THE TECHNOLOGIES

FINAL REPORT
FOR FISCAL YEAR
1971-1972

SUBMITTED
TO

UNITED STATES OFFICE OF EDUCATION
WASHINGTON, D.C.

NORTHERN APPALACHIA
TECHNOLOGY MODEL
TEACHER-CENTER

COLLEGE OF HUMAN RESOURCES AND EDUCATION
WEST VIRGINIA UNIVERSITY
MORGANTOWN, WEST VIRGINIA

JUNE, 1972

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APPALACHIA TEACHER CENTER
FOR
TEACHERS IN THE TECHNOLOGIES

I. Introduction:

The 'teacher center' concept for teachers in the technologies was instituted at West Virginia University under the auspicies of the United States Office of Education. The formulation of objectives for the 1971-72 teacher activities evolved from earlier efforts at West Virginia University on the study of technology and human resource development designed to promote technological literacy in the Northern Appalachian Region.

The original training center for teachers in the technologies resulted from a proposal submitted to the Ad Hoc National Advisory Committee on Training Complexes and was funded for 1970-71. This original model was called the "Industrial Task Analysis Training Model" which was later renamed to become known as the Northern Appalachia Micro-Pilot Training Center for Teachers in the Technologies.

Through an assessment of the 1970-71 micro-pilot program, it became quite evident that change can be initiated in educational programs in the technologies through carefully designed in-service teacher center model for the study of technology.

II. Purpose and Function:

The teacher center program for 1971-72 was designed to provide and initiate an organizational structure for in-service

teacher education that would improve the quality of the teaching-learning process in technology-based educational programs. In addition, it was to provide a sustaining program for in-service leadership training in the Northern Appalachia Region for education in the technologies. Considerable emphasis was placed on the latter through a training-of-trainer program to prepare selected classroom teachers capable of serving as local regional trainers that would become change agents. This program was considered necessary to obtain a multiplier effect for the purpose of utilizing earlier efforts and to obtain critical mass.

The activities for the 1971-72 Training Program for Teachers in the Technologies were designed to serve a number of different functions:

A. The identification and implementation of basic elements related to teacher center structure and operation.

   1. Expanded and operated an exemplary technological and environmental education research and resource facility adaptable to educational technological changes and a facility capable of meeting the needs of the teacher center program.

   2. The development of a system for the management of the various teacher center activities on a long-range plan.

   3. The development of a logical framework for planning activities through the use of program evaluation and review technique (PERT) with computer read-outs to aid in the management part of the total program.

B. Through the offerings of informal and formal in-service teacher education for teachers in the technologies with emphasis on teaching techniques on highly visualized instruction around specific concepts.

C. The design and operation of a training-of-trainer program for the purpose of developing classroom teachers capable of serving as local regional trainers and as change agents in their own locale.

1. Program concentrated on training for change and upgrading the quality of the teaching-learning process in the technologies.

2. Emphasis was placed on "what to teach" as well as "how to teach" in technology-based education programs to promote technological and environmental literacy.

3. Emphasized precision teaching based upon specific concepts to be taught on highly precise behavioral terms through the development of exemplary teaching-learning units.

4. Provided a base from which to field test the exemplary teaching-learning units in the classroom.

D. The investigation and implementation of contractual programs with counties in the development of new and improved educational programs in the technologies.

E. The development of precision teaching-learning units through contractual arrangement with selected experienced classroom teachers.

The overall problem identified for the 1971-72 Teacher Center for Teachers in the Technologies was to design, develop and implement a structure and program for in-service teacher education. It was anticipated that the program would alter or change the present inadequate teaching-learning processes in the educational programs in the region.

One of the assumptions was that if programs are to be changed, then the personnel of the system must first be changed. It was further felt that the classroom teacher who

is responsible for program operation at the local level is the critical variable within the change process. Considerable efforts were therefore directed towards preparing teachers for change. The program was flexible in order to meet the specific needs, and therefore the function, purpose and scope of the program changed and adapted as the needs, problems and desires of the clients were altered by the program.

The training-of-trainer phase of the program was concerned with the increasing of teacher competency levels so they would be more secure with change and more capable of engaging the questions of the quality of instruction and the structure of the schools which inhibit learning and good teaching.

In addition to the development of an organisational structure for the teacher center, considerable emphasis was placed on the development of selected classroom teachers qualified and capable of meeting the educational problems in the technologies caused by an ever-changing technological society. A training program was designed, organized and implemented to increase the competency of future local trainers in knowledge and performance in the areas of curriculum design, development of precision teaching-learning units, technical content, instructional strategies, and leadership. This was in keeping with the primary objective of providing the state and regions with sustaining leadership in the technology-based educational programs and to initiate those activities which have the greater certainty of multiplying the initial efforts.

In addition, the long-range goal of pilot support centers within regions or counties can be more easily met when better trained and knowledgeable personnel are available to administer the in-service training at the local levels. Once the support centers are established, it will allow the Northern Appalachian Teacher Center to not only manage the instructional programs in each of the support centers but also to serve the function as an "outside force." The center can remain "neutral" in the physical sense. More time could therefore be devoted to contractual arrangements with counties and regions to improve the educational process. It can draw from the already trained local trainers to aid in the actual implementation of contractual programs after the contractual arrangements are made with county school systems.

III. Operational Structure:

The basic operational structure for the teacher center was based upon the tenet that the way problems are solved and situations changed is by "starting from where you are." It concentrated on solving the problems related to improving instruction in an economical and efficient manner. Some of the basic premises were:

A. That the tasks to be identified will be those which teachers and others express as needs or which, as a result of the involvement in the programs, teachers find relevant,

B. That tasks will be those which can be specified in performance terms and attainable in a short period of time, and

C. That the teacher center will exist to provide services to local or regional educational

personnel on a contractual basis and that the success of the center will be measured in terms of continued use on the part of its customers.

The problem of teachers in the technologies has been the continuous change occurring in instructional content. Therefore, the program was directed at the basic variables affecting change which included diverse elements such as philosophy, people, programs, performance, practices, projections, precision practitioners, planning and instructional content. The Technology Modal Teacher Center was formulated to provide service functions in the area of program changes, program assessments and in-service teacher education. It directed its attention to planned change through newly designed concepts of alternative means in instructional strategies and around carefully selected and structured content relevant for life in a highly technological society.

The emphasis of the teacher center program was directed at individuals, rather than groups, and his development of listening, learning, teaching and other basic skills. It was designed to develop self-sustaining teacher/scholar capabilities necessary to engage the questions and meeting the challenge of change in an educational enterprise.

The structure and program of the teacher center for teachers in the technologies was designed to provide a flexible dynamic system capable of meeting the immediate and long-range needs. It was centered around the "real" teaching world for the performance competencies developed by each participant was directly implemented in the classroom immediately following the training program. This eliminated the gap between theory

and practice which is usual in the day-to-day world but in the case of change, is ineffective. The program was designed to allow the payoff in performance to occur in a relatively short time period.

IV. Management and Operation of Program:

The diverse nature of activities conducted through the teacher center required considerable planning, organizing, and controlling human and material resources and their interaction in order to attain the predetermined objectives. It was decided that the primary and secondary objectives had to be identified prior to the initiation of the activities to assure the fulfillment of the overall purpose of the teacher center program. The management phase of the program included planning of program; organizing by the establishment of a plan of action; motivating all the personnel concerned in the implementation of the program; and controlling the operation after it has been set in motion to assure that all objectives identified were met.

The program evaluation and review technique (PERT) was used to arrange activities in a logical framework for planning and controlling the operation of the program and to assure that the overall objectives were met. Prior to the initiation of the teacher center program, all major activities (phases) were placed on a PERT chart which was designated Level I. Most of the activities generated by brainstorming were also important, but contained within the phases of the overall objectives of the program. These major activities were

utilized to generate a second level or Level II chart. The time required to complete each activity and resources needed for each was then estimated. It was found that the second chart was already too complex to be readily used for scheduling; therefore, the computer was used to speed the remainder of the planning. A short FORTRAN "front end" program was written to match the data format to that of the program. The computer readouts provided the staff with estimated completion dates for all activities, the critical path, and the slack time along non-critical paths.

The next step in planning was to PERT all major Level II activities that were planned into detailed activities required for the implementaiton of the program.

The concepts generated while planning the activities of each major Level II activity were designated Level III. Estimates of time and resources used were not made for the Level III activities, but charts were made for each activity and compiled with higher level charts along with instructions in a prepared TPTT Planning Guide. (Appendix A)

The estimated completion dates which had been generated on the IBM 360 computer allowed the scheduling of major TPTT program activities. Most of the ancillary or secondary activities were scheduled by the individuals responsible for their implementation.

The PERT planning tool greatly aided the teacher center staff in reaching objectives and allowed a series of tasks to be accomplished in some prescribed order. Since many persons and educational organizations were involved in the

program, PERT planning aided in coordinating efforts in the fulfillment of the overall function and goals of the teacher center. In short, it served as a guide throughout the year in conducting various activities of the teacher center.

The operation phase of the teacher center for teachers in the technologies consisted of a multi-faced program with numerous major endeavors in conducting regional in-service teacher education programs; conducted a training-of-trainer program followed by field implementation; contractual teaching-learning unit development program; experimental program on the study of technology for the elementary shcool; and cooperatively formulated a contractual arrangement to develop a new structure for the study of technology in one county school system. These programs were cooperatively initiated by the State Department of Education through the State Supervisor of Industrial Arts who served as a liaison member between the cou ty school systems and the teacher center.

Each of the programs consisted of several phases which were as follows:

A. Regional in-service teacher education programs (Sea Appendix B)

   1. Scheduling of meetings for the seven regions

   2. Planning agendas for each meeting

   3. Preparation of program and instructional content

   4. Conducted meetings in seven regions

      a. Demonstrations
      b. Formal presentations
      c. Conducted survey to determine the needs in the field

d. Identification of potential trainers for the training-of-trainer program

5. Analysis of the field survey taken

6. Selection of trainers from applicants

7. Debriefing of regional meetings by the teacher center staff

B. Training-of-Trainer Program (See Appendix C)

1. Organizational phase

a. Identification and procurement of staff

b. Preparation of facilities

c. Selection of applicants

d. Contractual arrangement with school systems involved

e. Arrangements for reward system - (Continuing education unit credit)

2. Planning Training-of-Trainer Program

a. Needs identification

b. Matching needs with resources

c. Selection of initial training modules

d. Preparation of instruction materials

e. Staff training -

-Writing performance objectives
-Working papers on the development of teaching-learning units

3. Training Sessions (See Appendix D)

A series of six training sessions were held for a total of 54 clock hours of intensified training. The sessions were held on Thursday evening and Friday all day.

a. Session One - February 3 & 4, 1972
b. Session Two - February 17 & 18, 1972
c. Session Three - March 2 & 3, 1972
d. Session Four - March 23 & 24, 1972
e. Session Five - April 6, 7, & 8, 1972
f. Session Six - April 20 & 21, 1972

4. Application of practice and field evaluation (April 26-May 31, 1972)

5. Assessment of training-of-trainer program results

C. Contractual teaching-learning unit (TLU) development program (See Appendix E)

1. Organization and planning

a. Formulation of objectives
b. Designed and developed a TLU format (See Appendix E)
c. Selection of participants
d. Scheduling of meeting dates
e. Contractual arrangement with school systems involved
f. Preparation for seminars

2. Training and developmental sessions

a. Training seminar -- January 14, 1972 (Seminar on design, development, preparation and testing of TLU's in the technologies)

b. Design, development, preparation and testing of TLU's by selected participants (January 14 to May 12, 1972)

c. Training and progress reports on TLU design and development (February 25, 1972)

d. Second training and progress reports on TLU's (April 7, 1972)

e. Evaluation and assessment of TLU's (May 12, 1972)

D. Technology project for the elementary school

1. Research and development

a. Identification of needs
b. Procurement of resources

c. Investigation of study of technology programs presently offered at various states in the elementary schools

2. Two-day seminar on technology in the elementary school for interested classroom teachers and public school administrators

3. Designed and developed an experimental unit centered around a model city

4. Field tested the unit in an elementary school

5. Evaluation and assessment of the model city instructional unit

6. Proposed a tentative three-year program to design, develop and implement an experimental technology-based project for the elementary school in the Northern Appalachian Region

E. Tentative contractual arrangement with a county school system for the development and implementation of a curriculum in industrial arts and technology for grades 7-10. The proposed curriculum development program consists of six phases each comprising specific delimited objectives. Each phase of the program has been designed to be complete by itself. However, all phases are requited if the primary purpose of the program is to be accomplished. The total curriculum project if approved by all parties concerned will require three to four years to complete.

The operational structure and procedure of the Teacher Center for Teachers in the Technologies was problem oriented, task centered, and utilized a performance-based evaluation mode of operation. The activities of the center contributed toward the fulfillment of the primary objective through providing direct, tangible and specific leadership for the people in the region in meeting the needs of education in the technologies. This was accomplished by activities in research, resources and personnel training programs at all levels of

education in an economical and efficient manner. The activities engaged were those with the greatest centainty of multiplying the initial efforts in increasing the quality, scope and effectiveness of in-service teacher education in the technologies in the Northern Appalachian Region.

V. Assessment of the Results:

The teacher center staff utilized a number of assessment techniques for each of the programs offered. They included pre-tests, post-tests, participant performance, and open forum sessions. However, the primary modes of assessment involved field visitations for the purpose of observing the teacher in his home environment applying the new knowledge and techniques and classroom testing the precision teaching-learning units developed during the training program.

The participants rated the different programs offered through the teacher center very high in the attainment of the stated primary and secondary objectives. They had indicated that the program did have a direct impact upon them and specific schools and programs with regard to the new teaching-learning units and new instructional strategies.

The participants were also very positive in their reaction to the technology education Research and Resource Center which provided excellent guidance in supplying, demonstrating, and displaying new instructional resources during the regional in-service meetings as well as during the different sessions in the training program. They indicated that the resource center introduced the teachers and program participants to

tangible resources and instructional materials useful in the implementation of new instructional units in their respective schools.

The participants for the training-of-trainer program concluded that the amount of material presented during the six training sessions was excessive for the allotted time scheduled. They seemed insecure in the development of precision teaching-learning units. Many of them concluded that this insecurity was probably due to a lack of knowledge in precision teaching based upon precise performance objectives. Also, they had indicated that additional training was needed prior to their conducting in-service teacher education workshops. However, most of them were highly motivated and interested in pursuing the development of teaching-learning units to improve the instructional process in their own teaching responsibilities. They were enthused by the results and wanted to be included in future program offerings to qualify as a regional trainer within their own locale.

As part of the training-of-trainer program assessment, the participants were divided into groups to assess the total program. Their comments were recorded on tape for the purpose of TPTT staff debriefing and evaluation. Some of the most pertinent participants' comments were:

> "We felt that this was an excellent way to get teachers together to compare different programs. The instructional materials which were handed out were of the nature that if an individual wanted to change, he had the material to do it with."

> "It was great to get the administrative personnel to allow teachers time off from school to take part in a program of this nature."

"The training program created an awareness for change and provided insight as where to make a change in the educational process. However, we feel we could take a whole summer of this type of program and still maybe not know enough to develop the type of program that we would like to have."

"We thought it was very good that the State Department of Education has been involved and helped plan the activities and organization of the TPTT program."

"We felt that it was good to know that someone is interested in what the teachers are doing."

"I have attended and participated in various educational programs and have acquired a master's degree in the process, but this program has been the most rewarding and worthwhile of all."

These are random samples of the nature of comments made during the program assessment period. Most of them were positive in nature; however, there also were some negative reactions. One was that the program required considerable amounts of traveling to attend the training sessions. Many of the participants requested the consideration of training programs nearer their schools. The problem for future sessions will be of designing an efficient and economical delivery system which will cut down on the participants' travel time to take part in in-service teacher education. The design and implementation of a delivery system through regional in-service teacher education centers is of utmost importance within the structure and organization of the Northern Appalachian Teacher Center. The teachers trained as a result of the training-of-trainer program and others to be identified can ultimately manage the in-service education in their locale.

Another phase of the assessment period was that each school involved in the training program during 1971-72 was visited. During the visitation, each administrator was interviewed to obtain their reactions concerning the program and needs for in-service teacher education. Many of them felt that the teacher center concept is a worthwhile endeavor. Most of the administrators indicated that they noticed a marked increase in the classroom teachers' performance after having participated in the training program. They suggested that the in-service teacher education program for teachers in the technologies be continued and extended to include other disciplines.

The State Supervisor for Industrial Arts within the West Virginia State Department of Education served as the liaison member between the teacher center and the public schools. His efforts were extremely helpful in the planning, designing and implementation of the teacher center activities throughout the state.. We have found that working through the State Department of Education is an essential element in communicating with county public school systems.

The state supervisor views the teacher center concept as one of the most effective programs to improve the teaching-learning process in the technologies. His assessment of the 1971-72 teacher center activities is enclosed. (See Appendix F)

VI. Conclusion and Recommendations:

The present effort was a start in preparing individuals capable of improving the teaching-learning equation in the technologies for the region. The efforts did provide a guide and structure from which to build to reach critical mass. The teacher center model with the creation of proposed regional centers for sustaining in-service education does provide an organizational pattern which can be effective in meeting the educational problems of a changing technological society. The proposed model can accomplish the following:

A. Motivate individuals towards continuous learning to maintain, improve and add to the competencies of those teaching in the technologies at various levels of education within the region.

B. A flexible and adaptable structure designed to meet educational and technological change.

C. A model capable of serving the needs of individuals or groups within the local community, at a regional center or at the University center depending on need, complexity of instruction and resources required.

D. A model for short-term training and retraining programs at all levels in the technologies for teachers in education.

E. Contractual arrangements with schools and county education systems in fulfilling specified needs in specific programs.

F. An outside force for aiding personnel and schools in implementing change.

G. A model for the identification, development and delivery of teaching-learning units for classroom instruction.

In summary, the activities and programs which were offered by the Technology Model Teacher Center for the Appalachia Region served a number of essential purposes including:

A. Provided in-service teacher education (short-term) for 75% of the teachers in the technologies in the state of West Virginia;

B. Operated an exemplary technological education research and resource center adaptable to educational and technological changes and capable of meeting the needs of the teacher center as well as individual classroom teachers in the technologies;

C. Initiated numerous change strategies suitable for improving education in the technologies in the Northern Appalachia Region;

D. Provided both formal and informal consulting services for improvement of educational programs in the technologies;

E. Designed, developed and initiated management tools such as PERT to aid in controlling the operation of the numerous teacher center activities;

F. Prepared a Planning Guide for the operation of the teacher center over a three-year period;

G. Conducted a survey to determine the needs for teacher training and program improvements in the technologies of the state of West Virginia;

H. Identified, selected and trained 15 classroom teachers as potential field trainers for the teacher center;

I. Coordinated and provided liaison activities with other educational agencies in the region concerned with the study of technology and human resource development;

J. Identified, selected and evaluated a variety of new instructional materials such as games, simulations, program instructional materials, booklets, charts, and teaching models which can be used to enrich the instructional process in the technologies;

K. Investigated, designed and implemented a teaching-learning instructional unit format to be used in the development of a matrix of TLU's for teachers in the technologies;

L. Investigated, selected and formulated contractual programs with individual schools and counties;

M. Designed, planned and operated a contractual teaching-learning unit developmental program consisting of carefully selected classroom teachers to develop TLU's. Six teachers from a tri-state area after having attended a seminar, investigated, designed, developed and field tested precision TLU's;

N. Investigated the nature of technology in the elementary school; conducted a seminar for interested teachers and school administrators; developed a section on the study of technology in the elementary school within the teacher center Curriculum Research and Resource Center; and conducted a mini-pilot program in an elementary school;

O. Field visitation which provided excellent visibility of the teacher center efforts to school administrators in the region who were involved in the program; and

P. The establishment of a base from which to develop a hierarchy of trainers with various skill levels.

The reasons for the success of the various programs offered by the teacher center during 1971-72 were the freedom of the participants to express their feelings and ideas. The learning condition was such that there was constant interaction between the staff and the participants which had a great deal to do with the ultimate learning. The teacher center staff was sensitive to the interests and needs of the participants and the content offered was relevant to a major and significant part of what the participants themselves teach. The staff also used techniques in teaching which provided conceptual and procedural tools necessary for the participants to experiment with their own teaching methods in classrooms.

The whole process of in-service teacher education was change oriented. This was found to be essential in the

improvement of the teaching-learning process in the technologies. Early in the training program, it became quite evident that before one can engage the change process, a proper atmosphere for change had to be created. Open forums were held to bring the feelings, attitudes and present behaviors to the surface for the purpose of establishing commonality between participants and staff prior to engaging the question of change. It was learned that the most effective condition for dealing with change was when

A. the participants were directly involved in the discussion or learning process,

B. there was immediate feedback to the consequences of their behavior,

C. the activities engaged were perceived relevent to the participants' concern,

D. the learning activities were carefully designed to accomplish clearly conceived purposes, and

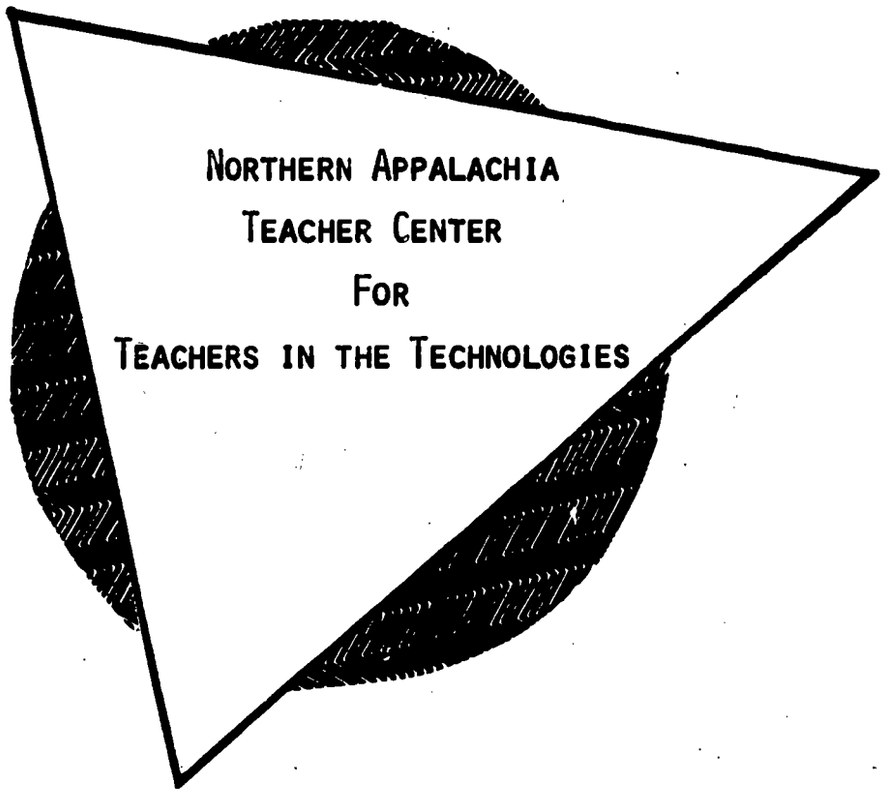
E. the efforts of the program focused attention toward the ultimate goals of field application and also when they perceived themselves as part of the process in serving as change agents.

The stage for sustaining in-service teacher education has been set within various areas of the Appalachia Region. But, in order to continue and expand the service, it will require an effective and highly selective communication system for the region related to meeting the problems and needs of education in the technologies. It is therefore recommended that a communication system be initiated which would contain a "sensing" system to determine weaknesses in the educational effort and a "scanning system" designed to locate information and resources pertinent to the solution of identified problems.

The problem of communication and delivery appear to be of major concern to obtain results from the initial efforts. The establishment of regional training centers is essential for the initiation and operation of programs to aid in the solution of localized and immediate problems. The regional centers would serve as a common base for local in-service education and can greatly aid the Technology Model Teacher Center in the establishment of effective communications throughout the Appalachia Region. At present, this is lacking.

APPENDICES

APPENDIX A



PLANNING GUIDE

CONTENTS

Introduction

This booklet is a guide for those interested in the teaching center concept of in-service teacher programs. TPTT (Training Program for Teachers in the Technologies) is a technology-based federally funded program for innovative in-service improvement of industrial arts teaching in the Appalachia Region (primarily West Virginia).[1]

Purpose

The purpose of this booklet is to aid the TPTT organization in planning and controlling its activities, provide information to its funding sources, provide information to the public, and serve as a guide for future programs.

How Developed

The TPTT organization made use of PERT (Program Evaluation and Review Technique) to plan the program. The initial phases involved:

1. Examining the major objectives of the program,
2. Idea generation related to the objectives,
3. Examining the secondary objectives of the program,

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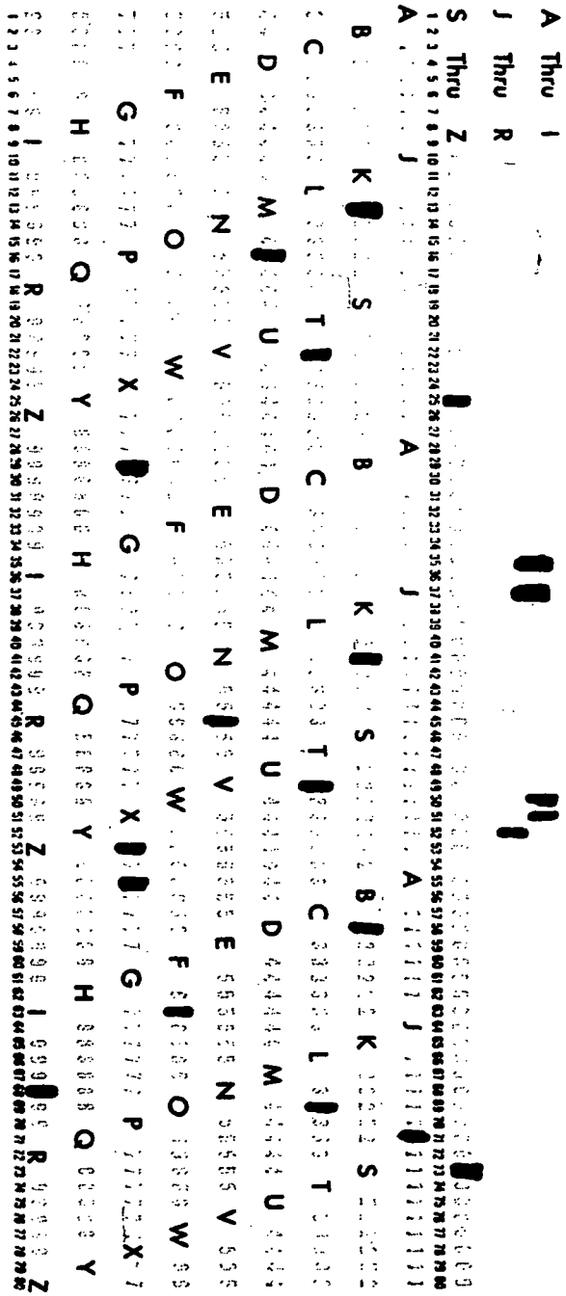
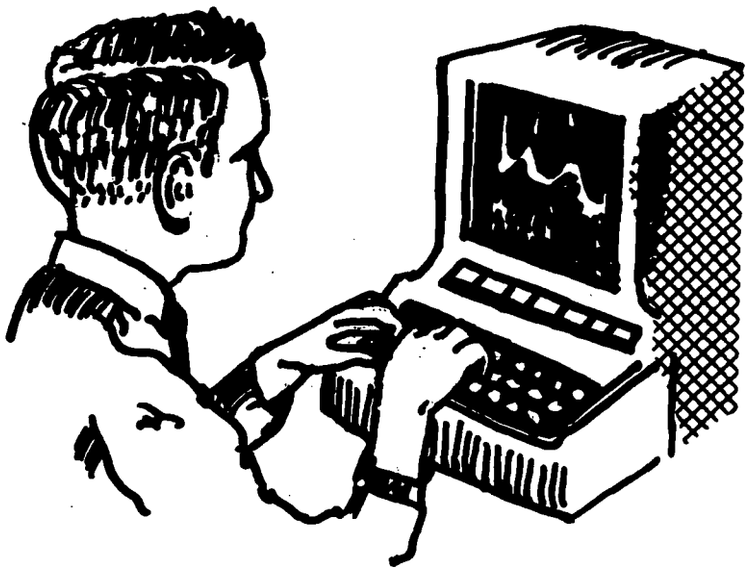
[1]Funded by USOE Grant





"But something happened on the way to today, a thunderous upheavel that sundered the path of time and cut yesterday adrift."

DON FABUN
Dynamics of Change

4. Generation of activities necessary to accomplish the objective, and

5. Assigning specific tasks to specific staff members.

The next step was to define the sequence and interrelationships of these activities in PERT charts. An overall chart was made, providing a skeleton of the major functional areas of the program. This chart was designated as Level I. Then, each functional area was detailed, providing charts for Level II. Finally, specific activities on the Level II charts (hammocks) were made into Level III charts where further detail was necessary.

How to Use

The booklet is easy to use. First, locate the area or function that you want to investigate on the three-level hierarchy on page 32. The charts on each level of the hierarchy are indexed by: 1) their title, 2) their starting and ending events, and 3) the page they occupy in the booklet.

The Computer Printout

A computer program was used to calculate PERT schedule information for TPTT. Activity time estimates, activity sequence information, activity resource allocation, and the activity titles were punched on cards. A complete Level II PERT output may be found attached to the overall TPTT PERT chart. Output information is summarized on the following page.

Media, by altering the environment, evoke in us unique ratios of sense perceptions. The extension of any one sense alters the way we think and act -- the way we perceive the world.

When
these
ratios
change,

MEN CHANGE.

I = Number of a starting event for an activity

J = Number of an ending event for an activity

D = Duration - the estimated time required to complete the activity

C1, C2, C3 = Quantity of resources (men) required to complete the activity

Description = Title of the activity (see glossary for key words)

ES = Earliest start (in tenths of weeks) the earliest time that this activity can be started

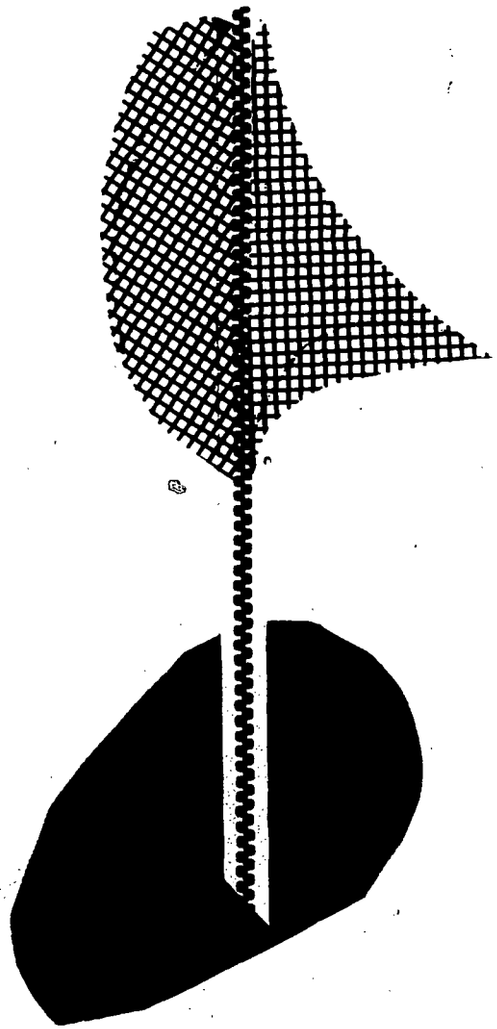
EF = Earliest finish (in tenths of weeks) the earliest time that this activity can be finished

LS = Latest start (in tenths of weeks) the latest time that this activity can be started without affecting the schedule (critical path)

LF = Latest finish (in tenths of weeks) the latest time this activity can finish without affecting the schedule (critical path)

F = Free slack (in tenths of weeks) - amount of delay allowed in starting or finishing this activity without affecting any other activity's schedule

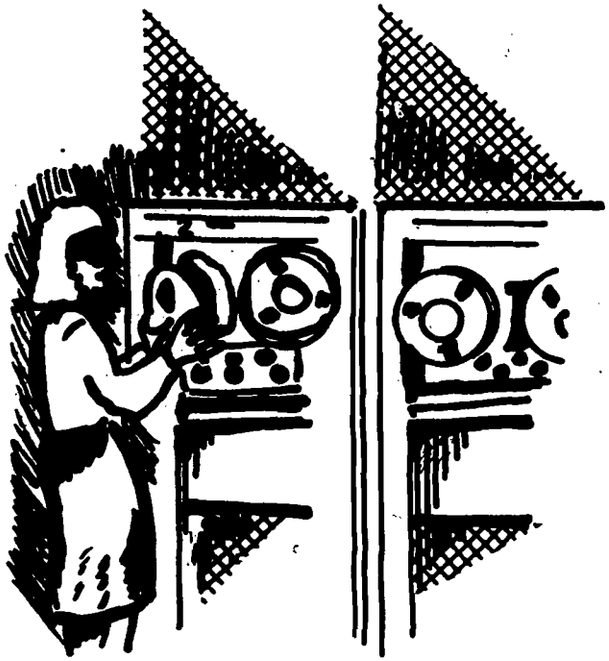
S = Slack (in tenths of weeks) - amount of delay allowed in starting or finishing this activity without affecting the schedule (critical path)



**** = Denotes the longest or "critical" path which has no slack and determines the program schedule

Management Tool

The following information is meant to be a flexible working "tool", allowing many changes in the chart activities to be made during the operation stages of the program. The critical path, however, of each of the charts (especially the overall Level I chart) is important because it predicts how long the activity will take. Although the critical path is where most management effort should be placed, shifting priorities, objectives, or environmental factors (i.e., loss of funds) may change the critical path. Other areas of concern should be those activities for which it is most difficult to estimate the time required to complete them.



"Man has always strived to free himself of drudgery. The results of this search have become the cornerstones upon which our civilizations have been built."

C. C. HURD
Chairman of the Board
Computer Usage Company

Glossary of Terms

Activity - Shown as a line with an arrow to show direction. On a PERT chart, an activity shows that time is being consumed, either in working or waiting

Ancillary Activities - Those activities which do not directly meet TPTT objectives

Assessment - Constructive evaluation which implements improvement of various TPTT activities

Center - A local (regional) facility for carrying out field TPTT programs

Contract - An agreement which will spell out conditions of operation between TPTT and participating teachers/schools/regions

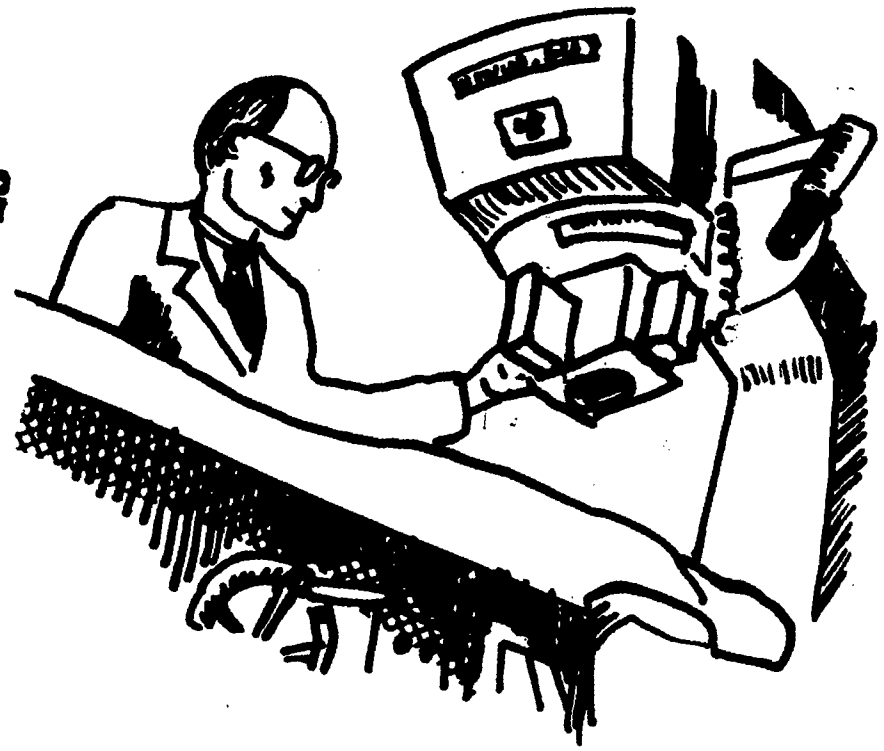
Critical Path - The longest (in time) path of activities in a PERT chart

CRRC - Curriculum Research and Resource Center

Dummy Activity - Shown as a dashed line on a PERT chart, a dummy activity merely indicates the need for completing a preceding event. No work is accomplished or time consumed.

"Since man first became aware of the Brain's existence, he has struggled to comprehend its miracles and miseries, punching crude holes in the bones that protect it and arbitrarily assigning moral and intellectual values to the lumps and bumps on its outer surface."

ADRIAN HOPE
LIFE Magazine



Event - Shown as a number with a circle around it on a PERT chart. An event determines the start or end of an activity. (No work is accomplished.)

Field Operations Manual - A handbook developed to assist teacher trainers to set up and operate regional in-service regional training centers

Field Program - Any activity which is conducted in a region, although it may be conducted by TPTT headquarters

Hammock - A PERT chart which details the activities associated with a major activity, but not the whole program

Instructional Resources - The hardware and software required to effectively teach units of instruction

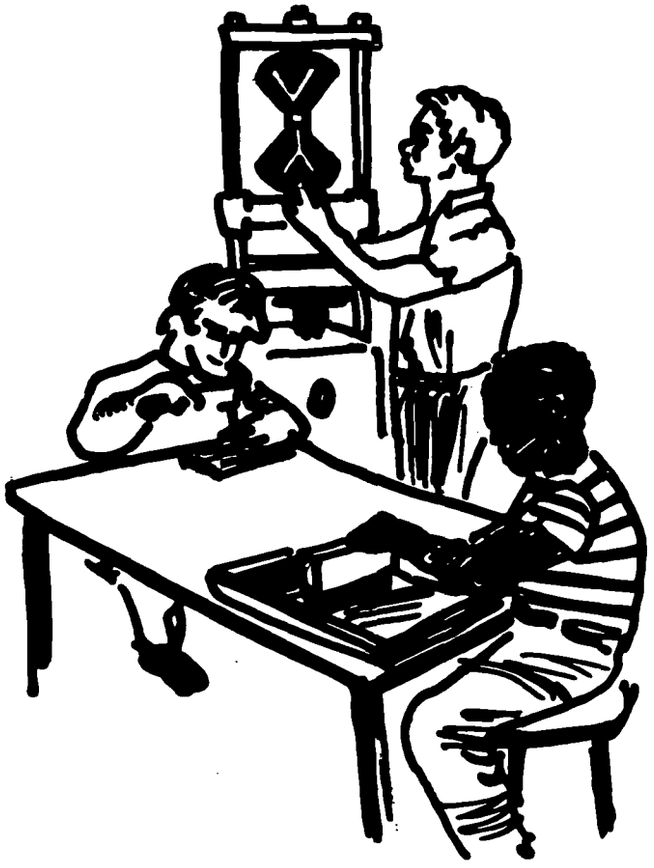
National News Center - Headquarters of information on all federal training programs (located at Stony Brook)

Participants - Industrial Arts teachers who take part in TPTT activities

PERT - Program Evaluation and Review Technique - Procedure used to plan and schedule TPTT

"We, in the twentieth century, are concluding an era of mankind five thousand years in length... We open our eyes like prehistoric men; we see a world totally new."

KURT MAROK
Archeologist



Pilot Program - Any activity which is run for the first time. The purpose of the pilot is to test ideas and plans of action.

Region - An area comprised of several counties which constitutes a major school governing unit within a state (there are seven regions in West Virginia).

Regional Coordinators - Individuals responsible for in-service teacher education in each region

Simulation - A way of representing (and simplifying) a real life situation

Staff - Training associates, associate director, CRRC director, trainers, and secretaries

STP - Staff Training Program All activities associated with orienting the TPTT staff

TLU - Teacher-Learner Unit - A well defined unit of instruction to be used by the teacher to facilitate the learning process

TPTT - Training Program for Teachers In the Technologies Title of the project

"Leverage at the top, a perception of crisis, sufficient time for the change to occur, a concrete vision of the direction of change ----These are minimal conditions for change toward innovation."

DONALD A. SCHON
Technology and Change

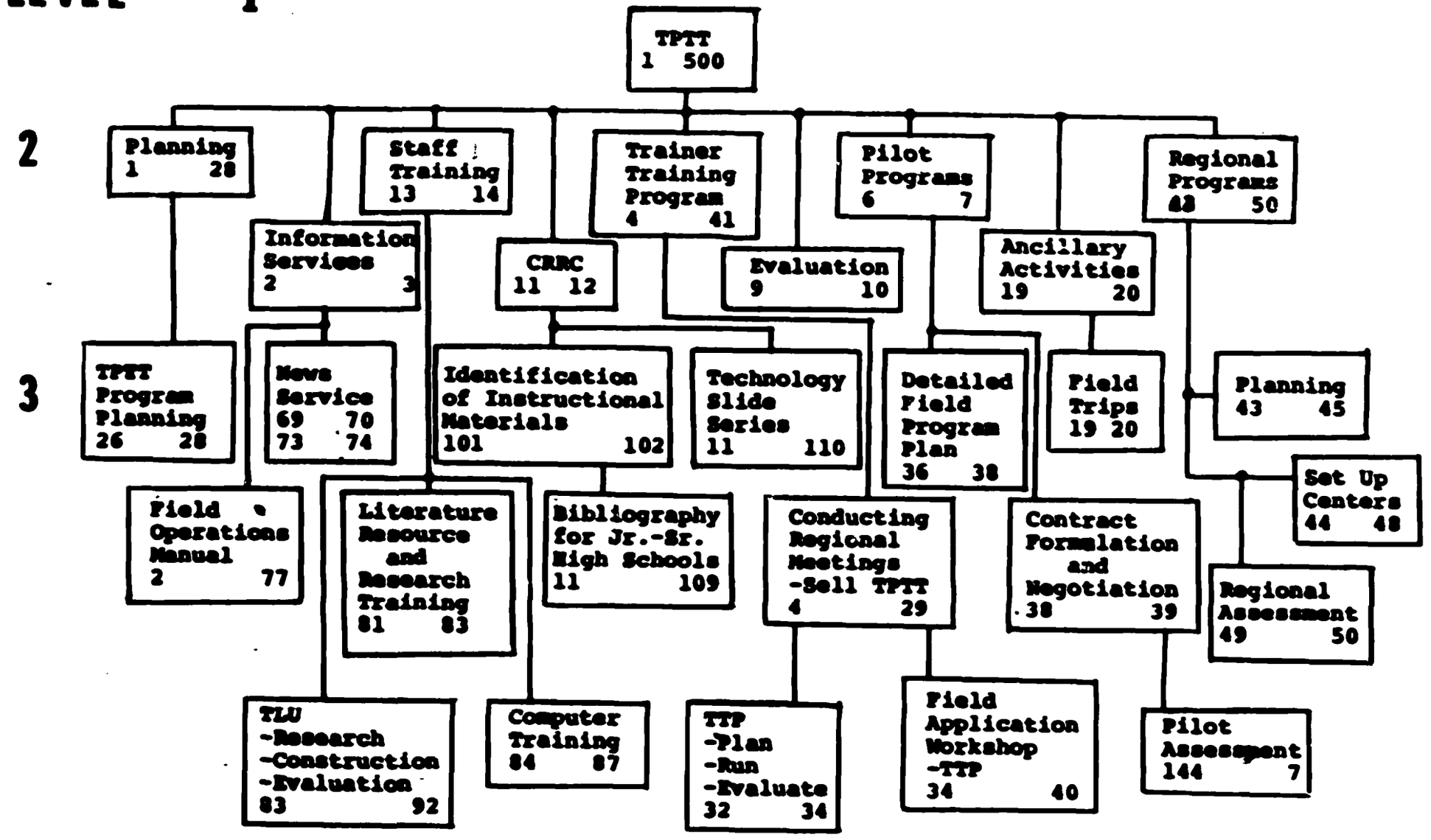
Training Associates - Individuals selected for their expertise who initiate activities in the TPTT organization

TTP - Trainer Training Program All activities associated with preparing teachers to become trainers of teachers.

USOE - United States Office of Education, A division of the United States Department of Health, Education, and Welfare

VIP's - Very Important Persons - State supervisors, local supervisors, superintendents, principals, and teachers who are vital to the success of TPTT operation

"WATFIV" - Acronym for a specialized computer language which is used for communicating with the 360/75 IBM computer at West Virginia University through telephone lines and a typewriter terminal.



Three Level Hierarchy

PAGE													DESCRIPTION	ES	EF	LS	LF	F	S
1	0	0	0	0	0	0	0	0	0	0	0	0	DUMMY (START EVALUATION)	0	0	1484	1484	0	1484
1	11	0	0	0	0	0	0	0	0	0	0	0	DUMMY (PLANNING STAFF TRA	0	0	0	0	0	0 00000
1	23	0	0	0	0	0	0	0	0	0	0	0	DUMMY (PLANNING)	0	0	8	8	8	8
2	69	23	1	0	0	0	0	0	0	0	0	0	CONTACT NATIONAL NEWS CEN	12	35	1101	1124	0	1089
2	71	67	1	0	0	0	0	0	0	0	0	0	CONTACT SUPPLIERS AND SER	12	72	1064	1124	0	1052
2	73	23	1	0	0	0	0	0	0	0	0	0	CONTACT STATE NEWS CENTER	12	35	1101	1124	0	1089
2	75	43	2	0	0	0	0	0	0	0	0	0	RESEARCH FIELD OPERATION	12	95	1301	1384	0	1289
3	15	0	0	0	0	0	0	0	0	0	0	0	DUMMY (END OF P.R.)	432	432	1484	1484	1052	1052
4	29	99	4	0	0	0	0	0	0	0	0	0	CONDUCTING REGIONAL MEETI	63	151	63	151	0	0 00000
6	35	2	4	0	0	0	0	0	0	0	0	0	IDENTIFY PILOT CENTERS	192	194	347	349	9	155
6	37	11	2	0	0	0	0	0	0	0	0	0	PRELIMINARY APPROVAL OF V	192	203	338	349	0	146
7	45	0	0	0	0	0	0	0	0	0	0	0	DUMMY(PILOTs END OF)	469	469	475	475	6	6
9	10	0	0	0	0	0	0	0	0	0	0	0	EVALUATION	0	0	1484	1484	1484	1484
10	500	0	0	0	0	0	0	0	0	0	0	0	DUMMY (END OF PROJECT)	1484	1484	1484	1484	0	0 00000
11	58	20	4	0	0	0	0	0	0	0	0	0	WAITING FOR FUNDS (1971)	12	32	403	423	0	391
11	101	45	4	0	0	0	0	0	0	0	0	0	IDENTIFICATION OF INSTRUC	12	57	1200	1245	0	1188
11	107	90	4	0	0	0	0	0	0	0	0	0	DEVELOP CLASSIFICATION SY	12	102	1200	1290	0	1188
11	109	136	2	0	0	0	0	0	0	0	0	0	ESTABLISH BIBLIOG FOR JR	12	148	1348	1484	0	1336
11	110	156	2	0	0	0	0	0	0	0	0	0	TECHNOLOGY SLIDE SERIES B	12	368	1128	1484	0	1116
11	111	95	2	0	0	0	0	0	0	0	0	0	WAIT BEFORE STARTING MOD	12	98	897	983	0	885
12	15	0	0	0	0	0	0	0	0	0	0	0	DUMMY (END OF TPTT)	1093	1093	1484	1484	391	391
13	27	4	4	0	0	0	0	0	0	0	0	0	ORIENTATION	0	4	0	4	0	0 00000
14	15	0	0	0	0	0	0	0	0	0	0	0	DUMMY (END OF ANCILLARY A	167	167	1484	1484	1317	1317
15	10	0	0	0	0	0	0	0	0	0	0	0	DUMMY (END OF PROJECT)	1484	1484	1484	1484	0	0 00000
22	23	4	4	0	0	0	0	0	0	0	0	0	IDENTIFY OBJECTIVES	4	8	4	8	0	0 00000
22	41	4	4	0	0	0	0	0	0	0	0	0	EXPLORE CORC	4	10	70	76	0	66
22	84	4	4	0	0	0	0	0	0	0	0	0	PERT TRAINING	4	8	8	12	0	4
22	93	60	1	4	0	0	0	0	0	0	0	0	FIELD TRIP (RYC)	4	64	1360	1420	0	1356
23	24	4	4	0	0	0	0	0	0	0	0	0	IDENTIFY ACTIVITIES AND N	8	12	8	12	0	0 00000
24	2	0	0	0	0	0	0	0	0	0	0	0	DUMMY (PA)	12	12	1064	1064	0	1052
24	11	0	0	0	0	0	0	0	0	0	0	0	DUMMY (CRRC)	12	12	403	403	0	391
24	25	11	4	0	0	0	0	0	0	0	0	0	REGIONAL MEETING PROGRAM	12	23	52	63	0	40
24	26	0	0	0	0	0	0	0	0	0	0	0	DUMMY (PERT TRAINING)	12	12	12	12	0	0 00000
25	6	0	0	0	0	0	0	0	0	0	0	0	DUMMY (TRAINER TRAINING)	23	23	63	63	40	40
25	145	2	2	0	0	0	0	0	0	0	0	0	ESTABLISH CREDIT FOR TEAC	23	25	231	233	0	208
26	27	41	4	0	0	0	0	0	0	0	0	0	TPTT PROGRAM PLANNING	12	53	12	53	0	0 00000
27	28	10	4	0	0	0	0	0	0	0	0	0	TPTT PROGRAM SCHEDULING	53	63	53	63	0	0 00000
28	4	0	0	0	0	0	0	0	0	0	0	0	DUMMY (TRAINER TRAINING)	63	63	63	63	0	0 00000
29	125	1	3	0	0	0	0	0	0	0	0	0	CLASSIFY ID CARDS	151	152	218	219	0	67
29	127	0	0	0	0	0	0	0	0	0	0	0	RECEIVING DETAILED PROGRA	151	151	220	220	0	69
29	134	63	1	0	0	0	0	0	0	0	0	0	CONTACTING POSSIBLE TRAIN	151	214	157	220	0	6
29	137	3	4	0	0	0	0	0	0	0	0	0	IDENTIFY NEEDS FOR REGION	151	154	211	214	0	60
29	154	1	2	0	0	0	0	0	0	0	0	0	FINAL LETTER TO SUPERI	151	152	151	152	0	0 00000
30	31	0	0	0	0	0	0	0	0	0	0	0	DUMMY MATCHING	193	193	220	220	27	27
30	43	107	4	0	0	0	0	0	0	0	0	0	IDENTIFY PROGRAM NEEDS AT	193	299	336	442	143	143
31	135	2	2	0	0	0	0	0	0	0	0	0	MATCH NEEDS TO PERSONNEL	214	216	220	222	0	6
31	136	2	2	0	0	0	0	0	0	0	0	0	MATCH REGION TO PERSONNEL	214	214	222	222	0	8
32	99	11	4	0	0	0	0	0	0	0	0	0	PLAN TRAINING PROGRAM	216	227	222	233	0	6
32	96	0	0	0	0	0	0	0	0	0	0	0	DUMMY (TRAINER IDENTIFICA	216	216	349	349	0	133
33	94	120	4	0	0	0	0	0	0	0	0	0	RUN STAFF TRAINING PROGRA	227	347	233	353	0	6

PAGE

CRITICAL PATH SCHEDULING

I	J		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	DESCRIPTION	ES	EF	LS	LF	F	S
34	40	20	3	0	0	0	0	0	0	0	0	0	TRAINER WORKSHOPS	347	367	353	373	0	6
35	36	0	0	0	0	0	0	0	0	0	0	0	IDENTIFY TRAINERS FOR CEN	203	203	349	349	13	146
36	38	4	4	0	0	0	0	0	0	0	0	0	DETAILED PILOT PROGRAM PL	216	220	349	353	0	133
37	35	0	0	0	0	0	0	0	0	0	0	0	DUMMY (CENTER IDENTIFICAT	203	203	349	349	0	146
38	39	7	4	0	0	0	0	0	0	0	0	0	DRAW UP CONTRACT (1)	220	227	353	360	0	133
39	41	13	2	0	0	0	0	0	0	0	0	0	ACQUISITION OF INSTRUCTIO	227	240	360	373	127	133
40	41	0	0	0	0	0	0	0	0	0	0	0	DUMMY (END OF TRAINER TRA	367	367	373	373	0	6
41	144	100	2	0	0	0	0	0	0	0	0	0	CLASSES HELD (1)	367	467	373	473	0	6
42	7	2	6	0	0	0	0	0	0	0	0	0	ASSESSMENT (1)	467	469	473	475	6	6
43	44	20	3	0	0	0	0	0	0	0	0	0	IDENTIFY REGIONAL CENTERS	442	462	485	505	43	43
43	45	33	6	0	0	0	0	0	0	0	0	0	PLAN PROGRAMS	442	475	442	475	0	0*****
44	48	66	2	0	0	0	0	0	0	0	0	0	SETTING UP CENTERS	505	571	505	571	0	0*****
45	46	30	2	0	0	0	0	0	0	0	0	0	CONTRACTS NEGOTIATED	475	505	475	505	0	0*****
46	44	0	0	0	0	0	0	0	0	0	0	0	DUMMY (FUNDS RELEASED)	505	505	505	505	0	0*****
47	43	0	0	0	0	0	0	0	0	0	0	0	DUMMY (APPROVAL)	442	442	442	442	0	0*****
48	49	880	5	0	0	0	0	0	0	0	0	0	RUN REGIONAL PROGRAMS	571	1451	571	1451	0	0*****
49	50	33	6	0	0	0	0	0	0	0	0	0	ASSESSMENT OF REGIONAL PR	1451	1484	1451	1484	0	0*****
50	15	0	0	0	0	0	0	0	0	0	0	0	DUMMY (END TPTT)	1484	1484	1484	1484	0	0*****
69	70	340	1	0	0	0	0	0	0	0	0	0	WORK FOR NATIONAL NEWS	35	395	1124	1484	0	1089
70	3	0	0	0	0	0	0	0	0	0	0	0	DUMMY (END OF PR)	395	395	1484	1484	37	1089
71	72	360	1	0	0	0	0	0	0	0	0	0	ACQUISITION OF SUPPLIES,	72	432	1124	1484	0	1052
72	3	0	0	0	0	0	0	0	0	0	0	0	DUMMY (END OF PR)	432	432	1484	1484	0	1052
73	74	360	1	0	0	0	0	0	0	0	0	0	WORK FOR STATE NEWS	35	395	1124	1484	0	1089
74	3	0	0	0	0	0	0	0	0	0	0	0	DUMMY (END OF PR)	395	395	1484	1484	37	1089
75	76	40	1	0	0	0	0	0	0	0	0	0	DESIGN FIELD OPERATION MA	95	135	1384	1424	0	1289
76	77	60	0	0	0	0	0	0	0	0	0	0	PRINTING	135	195	1424	1484	0	1289
77	3	0	0	0	0	0	0	0	0	0	0	0	DUMMY (END OF PR)	195	195	1484	1484	237	1289
81	11	0	0	0	0	0	0	0	0	0	0	0	DUMMY (START CRRC)	10	10	403	403	2	393
81	83	10	6	0	0	0	0	0	0	0	0	0	WVU LIBRARY ORIENTATION	10	20	76	86	0	66
82	105	60	3	0	0	0	0	0	0	0	0	0	IDENT OF INSTRUCTIONAL RE	583	628	1398	1443	424	815
83	85	103	5	0	0	0	0	0	0	0	0	0	TLU WP COMPLETED	20	123	86	189	0	66
84	26	0	0	0	0	0	0	0	0	0	0	0	DUMMY (PROGRAM PLAN)	8	8	12	12	4	4
84	87	40	2	0	0	0	0	0	0	0	0	0	COMPUTER TRAINING	8	88	1166	1246	0	1158
85	32	0	0	0	0	0	0	0	0	0	0	0	DUMMY (START PLAN)	123	123	222	222	93	99
85	86	43	4	0	0	0	0	0	0	0	0	0	TLU COMPLETED	123	166	189	232	0	66
86	92	1	6	0	0	0	0	0	0	0	0	0	EVALUATE TLU	166	167	232	233	0	66
87	88	76	2	0	0	0	0	0	0	0	0	0	INDIVIDUAL TRAINING	88	164	1246	1322	0	1158
88	14	0	0	0	0	0	0	0	0	0	0	0	DUMMY (END INDIVIDUAL TRA	164	164	1484	1484	3	1320
88	92	76	2	0	0	0	0	0	0	0	0	0	INDIVIDUAL TRAINING	164	240	1322	1398	343	1158
92	14	0	0	0	0	0	0	0	0	0	0	0	DUMMY (END STAFF TRAINING	167	167	1484	1484	0	1317
92	33	0	0	0	0	0	0	0	0	0	0	0	DUMMY (START TRAINING)	167	167	233	233	60	66
93	94	50	1	0	0	0	0	0	0	0	0	0	FIELD TRIP TO WESTINGHOUS	64	120	1428	1484	0	1364
94	95	0	0	0	0	0	0	0	0	0	0	0	FIELD TRIP TO SMITHSONIAN	120	120	1484	1484	0	1364
95	14	0	0	0	0	0	0	0	0	0	0	0	DUMMY (END FIELD TRIPS)	120	120	1484	1484	57	1364
98	71	0	0	0	0	0	0	0	0	0	0	0	DUMMY FUNDS (1ST YEAR)	32	32	1124	1124	60	1092
98	99	500	0	0	0	0	0	0	0	0	0	0	WAITING FOR FUNDS (1972)	32	532	423	923	0	391
98	101	0	0	0	0	0	0	0	0	0	0	0	DUMMY (BUYING RESOURCE)	32	32	1245	1245	25	1213
99	100	520	0	0	0	0	0	0	0	0	0	0	WAITING FOR FUNDS (1973)	532	1052	923	1443	0	391
99	102	1	0	0	0	0	0	0	0	0	0	0	DUMMY (BUYING RESOURCES-2	532	532	1347	1347	0	815
99	113	1	0	0	0	0	0	0	0	0	0	0	DUMMY (FUNDS FOR 2ND YEAR	532	532	1156	1156	0	624

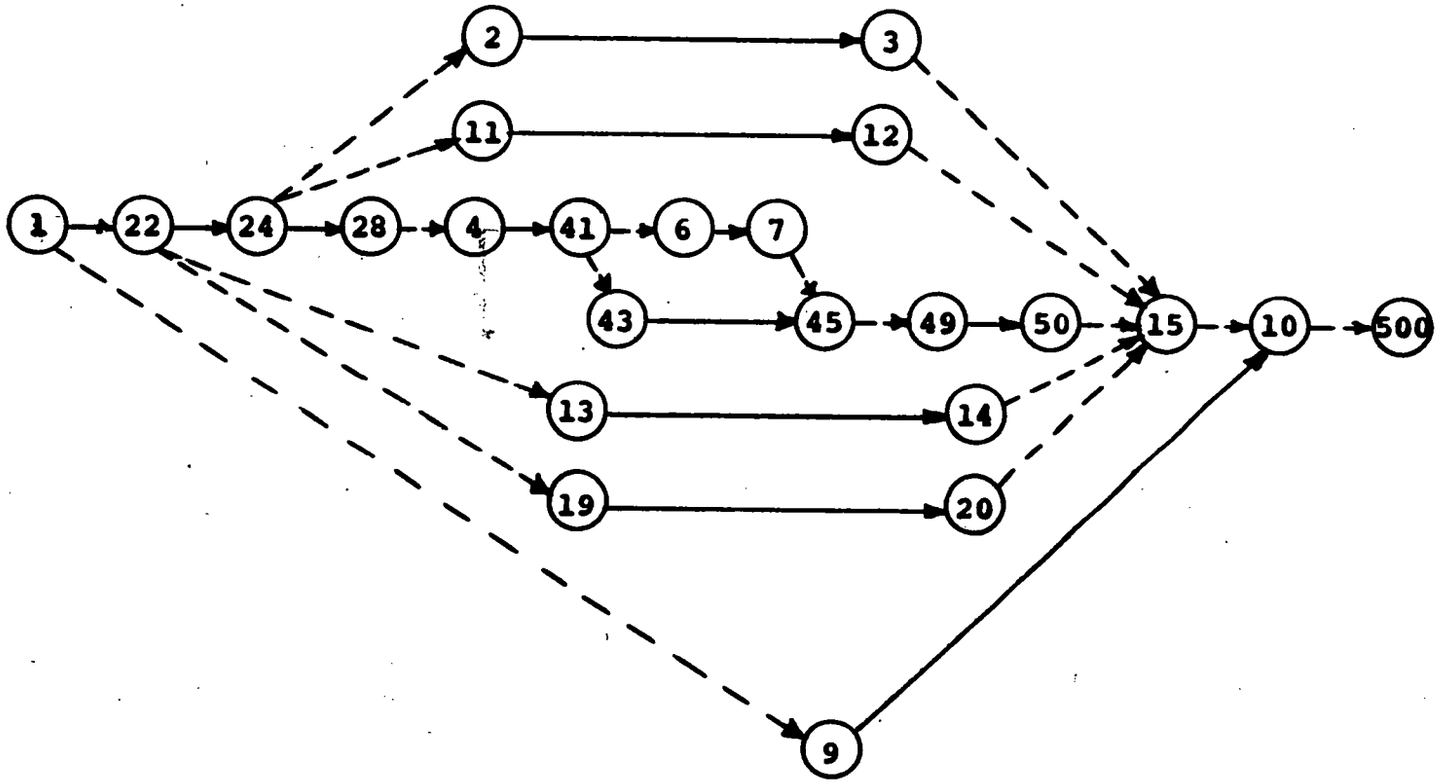
PAGE

CRITICAL PATH SCHEDULING

I	J											DESCRIPTION	ES	EF	LS	LF	F	S
100	105	0	0	0	0	0	0	0	0	0	0	DUMMY (BUYING RESOURCES-3	1052	1052	1443	1443	0	391
101	102	45	2	0	0	0	0	0	0	0	0	ACQUISITION OF 1971 RESOU	57	102	1245	1290	0	1188
102	108	12	1	0	0	0	0	0	0	0	0	CATALOG SUPPLIES (71)	102	114	1290	1302	0	1188
103	104	41	2	0	0	0	0	0	0	0	0	ACQUISITION OF 1972 RESOU	532	573	1347	1388	0	815
104	82	10	1	0	0	0	0	0	0	0	0	CATALOG SUPPLIES (1972)	573	583	1388	1398	0	815
105	106	41	2	0	0	0	0	0	0	0	0	ACQUISITION OF 1973 RESOU	1052	1093	1443	1484	0	391
106	17	0	0	0	0	0	0	0	0	0	0	DUMMY (END CRRC)	1093	1093	1484	1484	0	391
107	102	0	0	0	0	0	0	0	0	0	0	DUMMY (CATALOGING)	102	102	1290	1290	0	1188
108	109	45	0	0	0	0	0	0	0	0	0	IDENT OF INSTRUCTIONAL RE	114	159	1302	1347	373	1188
109	12	0	0	0	0	0	0	0	0	0	0	DUMMY (END CRRC)	148	148	1484	1484	945	1336
110	12	0	0	0	0	0	0	0	0	0	0	DUMMY (END CRRC)	368	368	1484	1484	725	1116
111	112	83	4	0	0	0	0	0	0	0	0	RESEARCH ON MOBILE TECHNO	98	181	983	1066	0	885
112	113	90	4	0	0	0	0	0	0	0	0	DESIGN OF MOBILE TECHNOLO	181	271	1066	1156	261	885
113	114	293	1	0	0	0	0	0	0	0	0	ACQUISITION OF MOBILE TEC	532	825	1156	1449	0	624
114	115	35	4	0	0	0	0	0	0	0	0	UNIT READY FOR USE	825	860	1449	1484	0	624
115	12	0	0	0	0	0	0	0	0	0	0	DUMMY (END CRRC)	860	860	1484	1484	233	624
125	126	1	3	0	0	0	0	0	0	0	0	RANK CARDS WITHIN CLASS	152	153	219	220	0	67
126	133	0	1	0	0	0	0	0	0	0	0	FILE CARDS AND SHEETS	153	153	220	220	0	67
127	128	0	0	0	0	0	0	0	0	0	0	DUMMY (RANKING)	151	151	220	220	2	69
133	31	0	0	0	0	0	0	0	0	0	0	DUMMY (TRAINERS IDENTIFIC	153	153	220	220	61	67
134	31	0	0	0	0	0	0	0	0	0	0	DUMMY (TRAINERS IDENTIFIC	214	214	220	220	0	6
135	32	0	0	0	0	0	0	0	0	0	0	DUMMY (TRAINERS IDENTIFIC	216	216	222	222	0	6
136	135	0	0	0	0	0	0	0	0	0	0	DUMMY (IDENTIFY AND MATCH	214	214	222	222	2	8
137	138	3	4	0	0	0	0	0	0	0	0	NEEDS CLASSIFICATION	154	157	214	217	0	60
138	141	0	0	0	0	0	0	0	0	0	0	DUMMY (NEEDS)	157	157	217	217	33	60
139	140	38	0	0	0	0	0	0	0	0	0	RECEIVING SUPERINTENDENTS	152	190	152	190	0	0****
140	141	0	0	0	0	0	0	0	0	0	0	DUMMY	190	190	217	217	0	27
140	142	2	1	0	0	0	0	0	0	0	0	ESTABLISH VIP FILE	190	192	190	192	0	0****
141	30	3	6	0	0	0	0	0	0	0	0	IDENTIFY NEEDS	190	193	217	220	0	27
142	0	0	1	0	0	0	0	0	0	0	0	DUMMY (START PILOT)	192	192	336	336	0	144
142	31	0	1	0	0	1	0	0	0	0	0	DUMMY (TEACHERS IDENTIFIC	192	192	220	220	22	28
142	47	250	2	0	0	0	0	0	0	0	0	OBTAIN PRELIMINARY VIP AP	192	442	192	442	0	0****
144	7	0	0	0	0	0	0	0	0	0	0	DUMMY (PILOT END)	467	467	475	475	2	8
144	42	0	0	0	0	0	0	0	0	0	0	DUMMY (ASSESSMENT) (1)	467	467	473	473	0	6
145	33	0	0	0	0	0	0	0	0	0	0	DUMMY (BEGIN STAFF TRAINI	25	25	233	233	202	208

**** DENOTES A CRITICAL PATH ACTIVITY

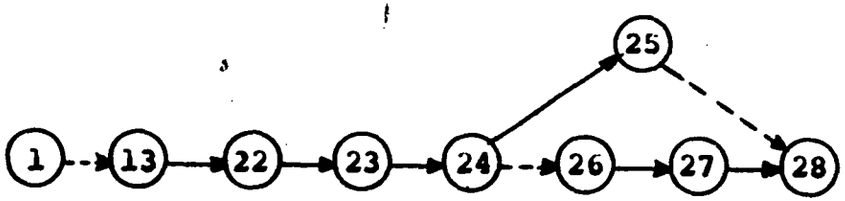
LEVEL 1: TPTT PROGRAM



ACTIVITIES

1	→	28	Planning
2	→	3	Public Relations
11	→	12	CRRC
13	→	14	Staff Training Program
19	→	20	Ancillary Activities
9	→	10	Evaluation
4	→	41	Trainer Training Program
6	→	7	Pilot Program(s)
43	→	50	Regional Programs

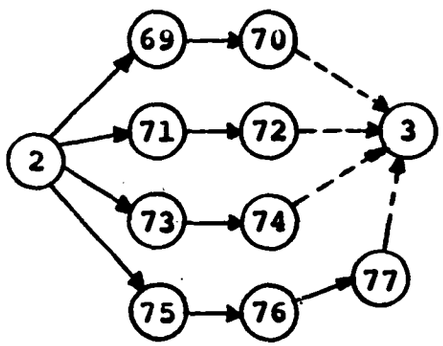
LEVEL II: PLANNING THE TPTT PROGRAM



ACTIVITIES

1	→ 13	Dummy (start staff training)
13	→ 22	Orientation
22	→ 23	Identify objectives for TPTT
23	→ 24	Identify TPTT activities and men
24	→ 26	Dummy (end of PERT training)
24	→ 25	Planning regional meetings
26	→ 27	TPTT program planning (detailed)
27	→ 28	TPTT program scheduling
25	→ 28	Dummy (TPTT scheduled)

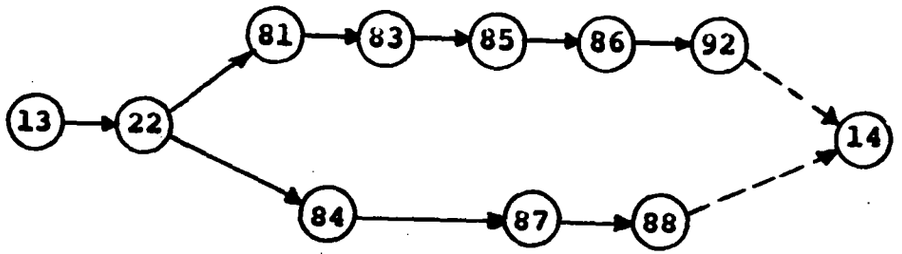
LEVEL II: INFORMATION SERVICES FOR THE TPTT PROGRAM



ACTIVITIES

2	→ 69	Contact national news centers
2	→ 71	Contact suppliers and services
2	→ 73	Contact state and local news centers
2	→ 75	Research field operations
69	→ 70	Provide information for national news
71	→ 72	Acquisition of supplies
73	→ 74	Provide information for state and local news
75	→ 76	Design field operations manual
76	→ 77	Print field operations manual
70	→ 3	Dummies (End of P.R.)
72	→ 3	
74	→ 3	
77	→ 3	

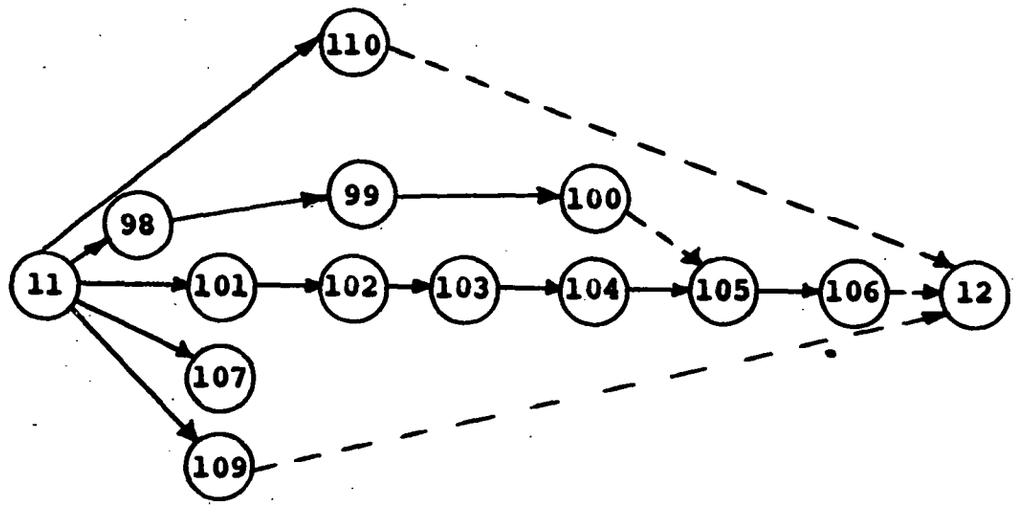
LEVEL II: STAFF TRAINING PROGRAM



ACTIVITIES

13	→	22	Orientation
22	→	81	Explore CRRC
22	→	84	PERT training
81	→	83	Literature research resource training
83	→	85	TLU working paper
85	→	86	TLU construction
86	→	92	TLU evaluation
92	→	14	Dummy (End of staff training)
84	→	87	Computer training
87	→	88	Individual training
88	→	14	Dummy (End of staff training)

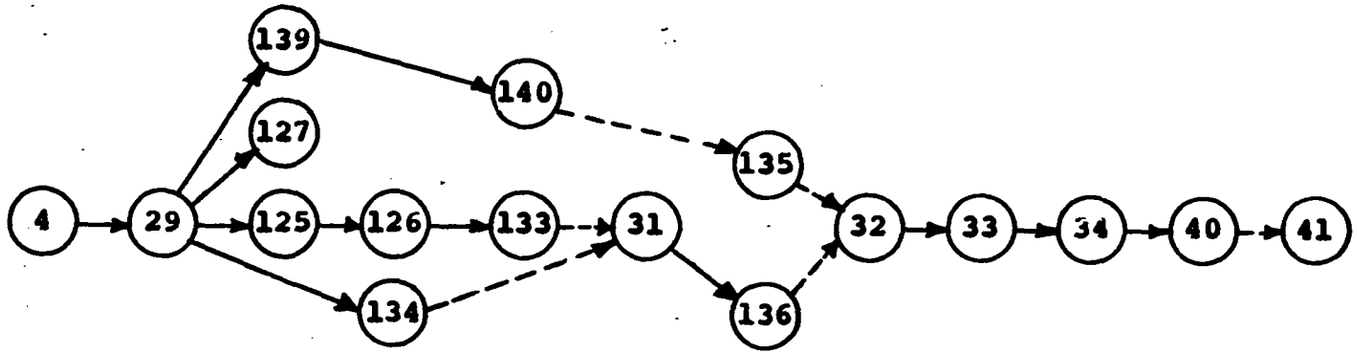
LEVEL II: CRRC (CURRICULUM RESEARCH AND RESOURCE CENTER)



ACTIVITIES

11	→	98	Waiting for funds (1971)
11	→	101	Identification of instructional materials (1971)
11	→	107	Develop a classification system
11	→	109	Establish bibliography for Jr. & Sr. high school
11	→	110	Develop a technology slide series
98	→	99	Waiting for funds (1972)
99	→	100	Waiting for funds (1973)
98	→	101	Dummy (Start acquiring 1971 resources)
101	→	102	Acquisition of 1971 resources
99	→	103	Dummy (Start acquiring 1972 resources)
102	→	103	Identification of instructional materials (1972)
103	→	104	Acquisition of 1972 resources
100	→	105	Dummy (Start acquiring 1973 resources
104	→	105	Identification of instructional materials (1973)
105	→	106	Acquisition of 1973 resources
107	→	102	Dummy (Cataloging)
106	→	12	Dummies (End of CRRC)
109	→	12	
110	→	12	

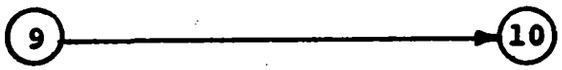
LEVEL II: TRAINER TRAINING PROGRAM



ACTIVITIES

4	→ 29	Conducting regional meetings
29	→125	Classifying I.D. cards
29	→127	Receiving detailed personnel sheets
29	→134	Contacting possible trainers
29	→139	Form and letter sent to superintendents
125	→126	Rank cards within class
126	→133	File cards and sheets
127	→126	Dummy (Ranking)
133	→ 31	Dummy (Trainers identified)
134	→ 31	Dummy (Trainers identified)
31	→135	Match needs to personnel
31	→136	Match region to personnel
135	→ 32	Dummy (Trainer classification)
136	→ 32	Dummy (Trainer classification)
32	→ 33	Plan training program
33	→ 34	Run trainer training program
34	→ 40	Trainer workshops held
40	→ 41	Dummy (End of trainer training)
139	→140	Receiving information from superintendents
140	→135	Dummy (Needs identified)

LEVEL II: EVALUATION OF TPTT

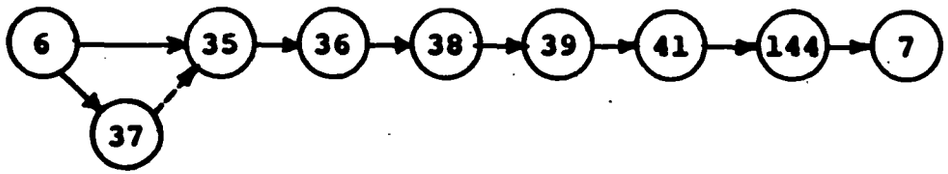


ACTIVITIES

Note:

Evaluation to be completed by an outside source or agency

LEVEL II: TPTT PILOT PROGRAM(S)



ACTIVITIES

6	→ 35	Identify pilot centers
6	→ 37	Preliminary approval of V.I.P.'s
35	→ 36	Identify trainers for center
36	→ 38	Detailed field program plan
37	→ 35	Dummy (Center identification)
38	→ 39	Draw up contract (1)
39	→ 41	Acquisition of instructional materials
41	→144	Classes held (1)
144	→ 7	Assessment of pilot

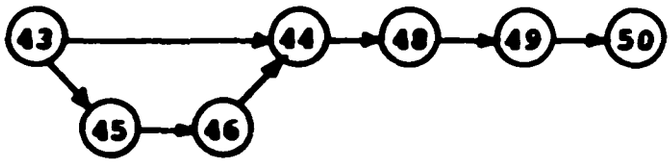
LEVEL II: ANCILLARY ACTIVITIES

ACTIVITIES

Note:

Ancillary activities will be identified by participants during the actual training program.

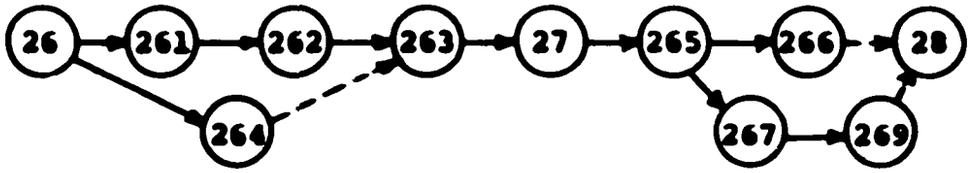
LEVEL II: TPTT REGIONAL PROGRAMS



ACTIVITIES

43	→ 44	Identify regional centers
43	→ 45	Plan regional programs
45	→ 46	Contracts negotiated
46	→ 44	Dummy (Funds released)
44	→ 48	Setting up centers
45	→ 49	Run regional programs (1972)(1973)
49	→ 50	Assessment of regional programs

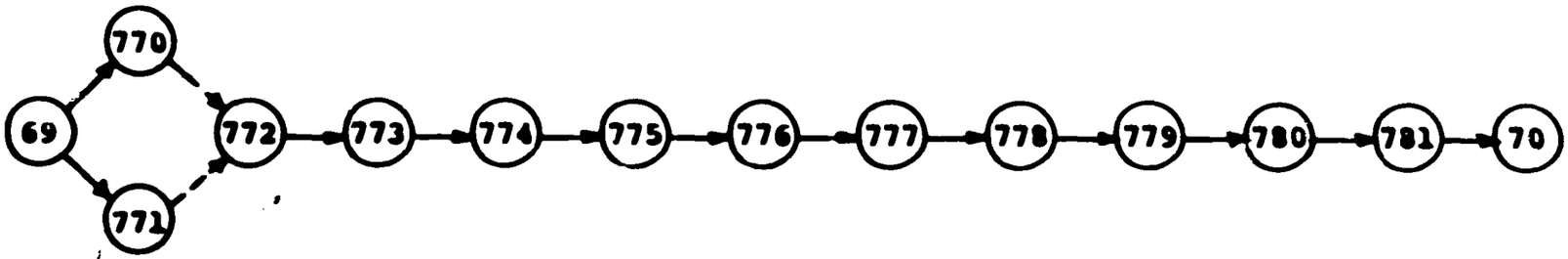
LEVEL II: DETAILED TPTT PROGRAM PLANNING AND SCHEDULING



ACTIVITIES

26 → 261	Develop hierarchy of activities
261 → 262	Draw overall PERT chart
262 → 263	Draw detailed PERT charts
26 → 264	Obtain PERT computer program
264 → 263	Dummy (Start time estimation)
263 → 27	Estimate time and resources for each activity
27 → 265	Run computer program
265 → 266	Draw working PERT charts with accompanying tables
265 → 267	Develop a coded timetable of available time
267 → 268	Schedule TPTT activities
268 → 269	Calculate probability of success (if necessary)
269 → 28	Dummy (TPTT program scheduled)
266 → 28	Dummy (TPTT program displayed)
267 → 266	Dummy (Scheduling data for charts ready)

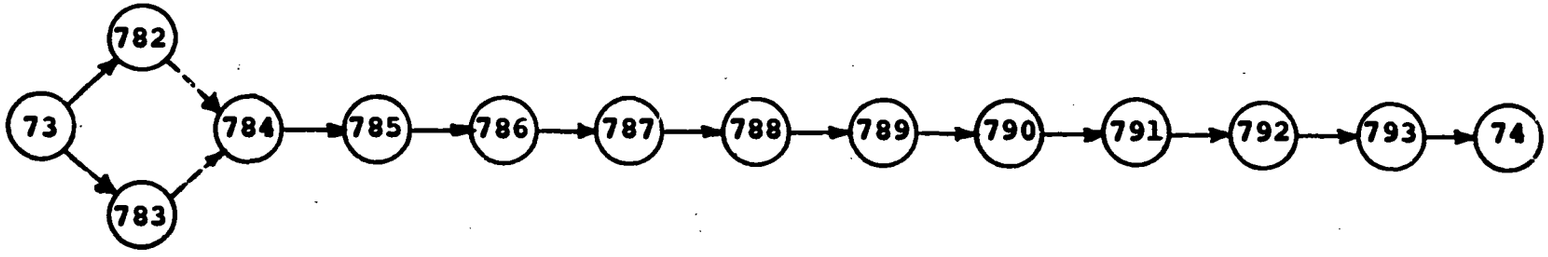
LEVEL III: INFORMATION SERVICES



ACTIVITIES

69	→770	Gather news information
69	→771	Arrange for photographs
770	→772	Dummy (End info gathering P.R.)
771	→772	Dummy (End info gathering P.R.)
772	→773	Write story
773	→774	Type story
774	→775	Get approval
775	→776	Make changes
776	→777	Retype copy
777	→778	Prepare news release
778	→779	Mail news release
779	→780	Await publication
780	→781	Verify article
781	→ 70	Clip and save

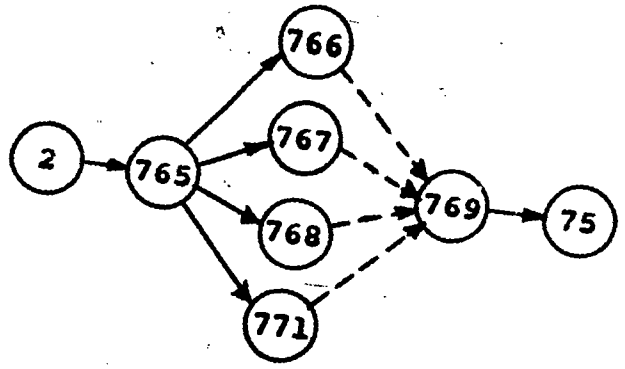
LEVEL III: INFORMATION SERVICES



ACTIVITIES

73	→782	Gather news information
73	→783	Arrange for photographs
782	→784	Dummy (End info gathering P.R.)
783	→784	Dummy (End info gathering P.R.)
784	→785	Write story
785	→786	Type story
786	→787	Get approval
787	→788	Make changes
788	→789	Retype copy
789	→790	Prepare news release
790	→791	Mail news release
791	→792	Await publication
792	→793	Verify article
793	→ 74	Clip and save

LEVEL III: RESEARCH FIELD OPERATIONS



ACTIVITIES

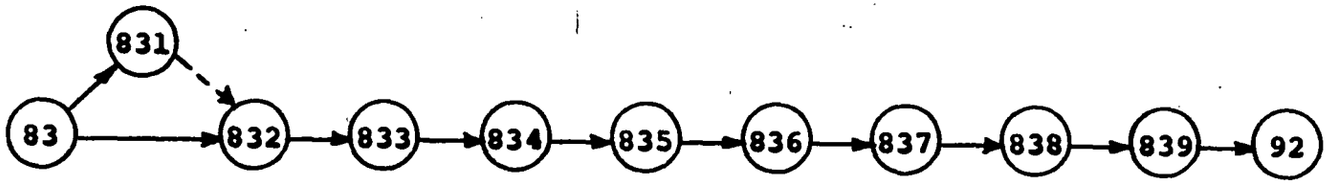
2	→765	Review literature
765	→766	Collect photographs and artwork
765	→767	Collect articles
765	→768	Collect printing samples
765	→769	
767	→769	Dummies (End of research - F.O.M.)
768	→769	
771	→769	
769	→ 75	Categorize all information
765	→771	Contact CRRC specialist

LEVEL III: DESIGN AND FIELD OPERATIONS MANUAL

ACTIVITIES

75	→751	Contact area specialists
751	→752	Conduct staff meeting
752	→753	Prepare context (format)
753	→754	Prepare sketches
754	→755	Submit for preliminary approval
755	→756	Make changes
756	→757	Provide cost estimates
757	→758	Conduct final approval meeting
758	→759	Arrange for publication
759	→760	Printing of F.O.M.
760	→761	Await delivery
761	→ 77	Distribute publications

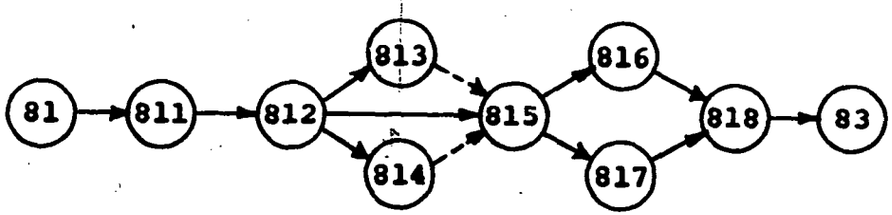
LEVEL III: PREPARING A TLU



ACTIVITIES

83	→831	Funding TLU information in library
83	→832	Ordering TLU information from known sources
832	→833	Waiting for TLU information
831	→832	Dummy (Finding all sources)
832	→833	Considering possible models for TLU
833	→834	Select TLU model to be used
834	→835	Reorganize subject matter to fit TLU model
835	→836	Test TLU unit (staff)
836	→837	Analyze test results
837	→838	Improve TLU Unit
838	→839	Apply TLU in the field
839	→ 92	Modify TLU to field needs

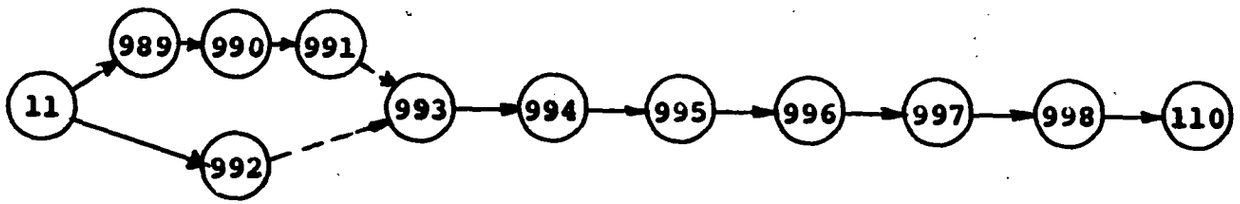
LEVEL III: STAFF LITERATURE RESOURCE AND RESEARCH TRAINING



ACTIVITIES

81	→811	Locate sources of information
811	→812	Visit sources of information
812	→813	Take photos
812	→814	Gather literature
812	→815	Learn procedures
813	→815	Dummy (start planning)
814	→815	Dummy (start planning)
815	→816	Plan slide series
815	→818	Plan booklet
816	→818	Construct slide series
817	→818	Make booklet
818	→ 83	Run program

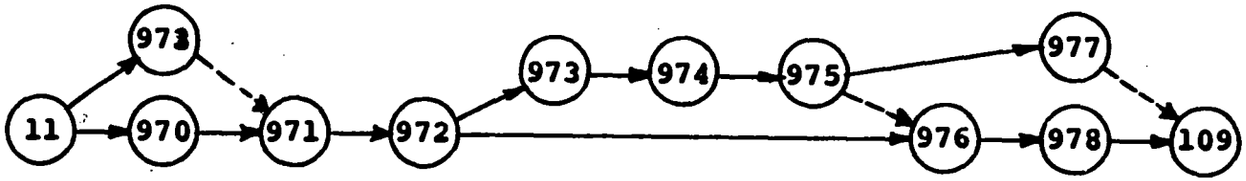
LEVEL III: SLIDE SERIES TECHNOLOGY



ACTIVITIES

11	→989	Determine general areas series will cover
989	→990	Determine specific areas series will cover
990	→991	Locate and procure specific sources of material
11	→992	Buy film
11	→993	Set up area for taking pictures
991	→993	Dummy (material available)
992	→993	Dummy (film available)
993	→994	Take pictures of selected materials
995	→996	Have film developed
996	→997	Classify slides
998	→110	File slides

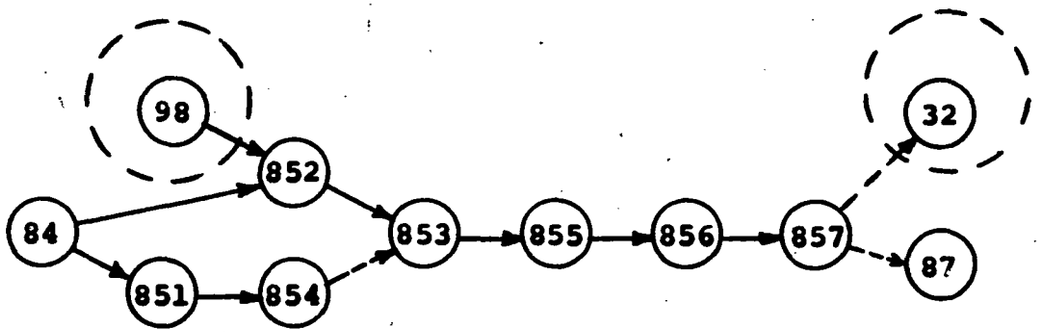
LEVEL III: JUNIOR-SENIOR HIGH BIBLIOGRAPHIES



ACTIVITIES

11	→970	Seek locator sources
970	→971	Look through locator sources for relevant books
971	→972	List books according to grade levels
11	→973	Set criteria for grade levels
973	→971	Dummy (list books)
972	→973	Order selected books
973	→974	Wait for receipt of books
974	→975	Review books
972	→976	Revise book list
975	→976	Dummy (revise book list)
975	→977	Return books
977	→978	Make copies of list (bibliography)
979	→109	Make bibliographies available to public
977	→109	Dummy (books returned)

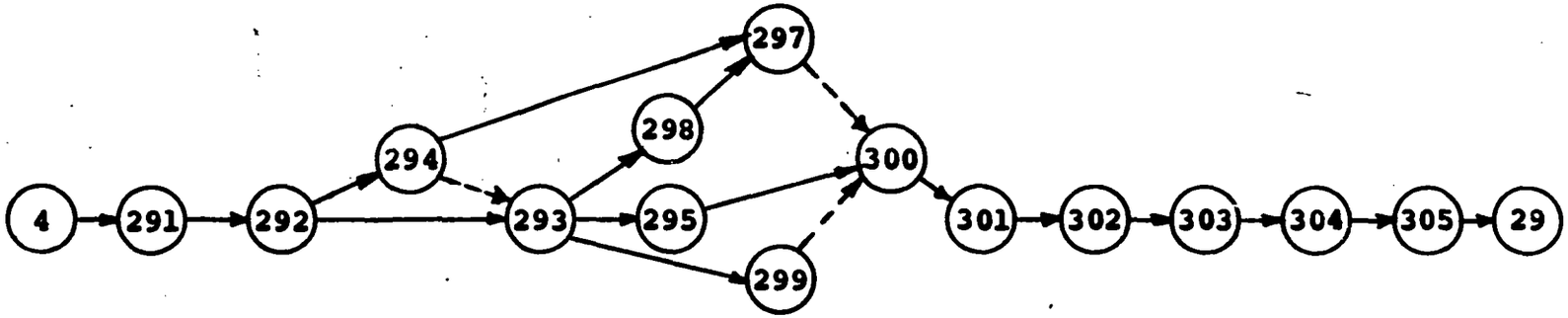
LEVEL III: COMPUTER TRAINING



ACTIVITIES

84	→851	Orientation to WVU computer facilities
84	→852	Arrange for terminal installation with computer center
852	→853	Installation of terminal
98	→852	Funds released to rent terminal
851	→854	Train staff in computer fundamentals
854	→853	Dummy (start "WATFIV")
853	→855	On-line training in "WATIV"
855	→856	Computer simulations planned
856	→857	Computer summations programmed
857	→ 87	Dummy (End of computer training)
857	→ 32	Dummy (Start trainer training)

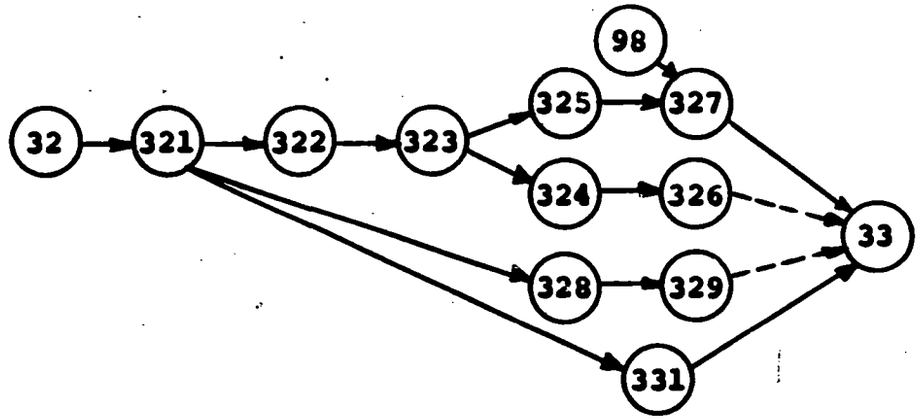
LEVEL III: CONDUCTING REGIONAL IN-SERVICE MEETINGS



ACTIVITIES

4	→291	Contact State Department of Education for approval
291	→292	Notify regional coordinators
292	→293	Plan program
292	→294	Establish date and meeting place
294	→293	Dummy (Planning completed)
293	→295	Make up program
295	→296	Mail program to teachers
294	→297	Gather program materials
293	→298	Compile list of materials
298	→297	Dummy (Materials accumulated)
293	→298	Arrange lodging
295	→300	Confirm meeting
297	→300	Dummies (Start meeting)
299	→300	
300	→301	Travel to meeting
301	→302	Set up for meeting
302	→303	Hold meeting
303	→304	Return
304	→305	Debriefing
305	→ 29	Record and file information gathered

LEVEL III: PLANNING TRAINER TRAINING PROGRAM



ACTIVITIES

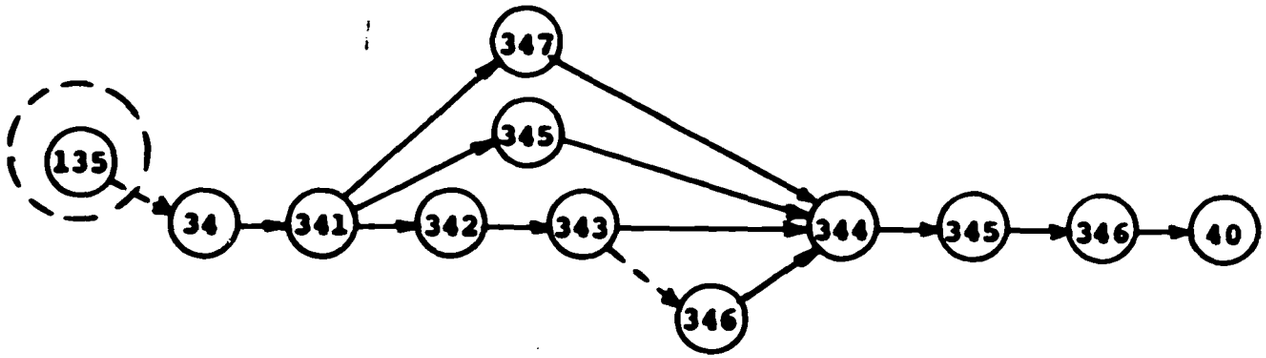
32	→321	Establishing priorities (objectives)
321	→331	Notification of participants and superintendents
321	→322	Determine order of training areas (scheduling)
322	→323	Break training areas into teaching units
323	→324	Determine time requested for each unit
323	→325	Determine materials needed for each unit
324	→326	Detailed planning of each unit (scheduling)
325	→327	Ordering instructional resources
321	→328	Identify ancillary activities
328	→329	Plan ancillary activities
328	→330	Plan physical facilities
327	→ 33	Waiting for instructional resources
326	→ 33	Dummies (End TTP planning)
329	→ 33	
98	→327	Dummy (Funds for 1971)
329	→ 33	Dummy (End TTP planning)
331	→ 33	Confirmation of participation from participants and superintendents

LEVEL III: RUN TRAINER TRAINING PROGRAM

ACTIVITIES

33	→341	General orientation
341	→342	Hold organizational meeting(s)
342	→343	Get to "know" trainers
343	→344	Technical area orientation
344	→345	Run planned program
345	→346	Trainer evaluation
346	→347	Arrange field workshop
347	→ 34	Dummy (End of TTP)

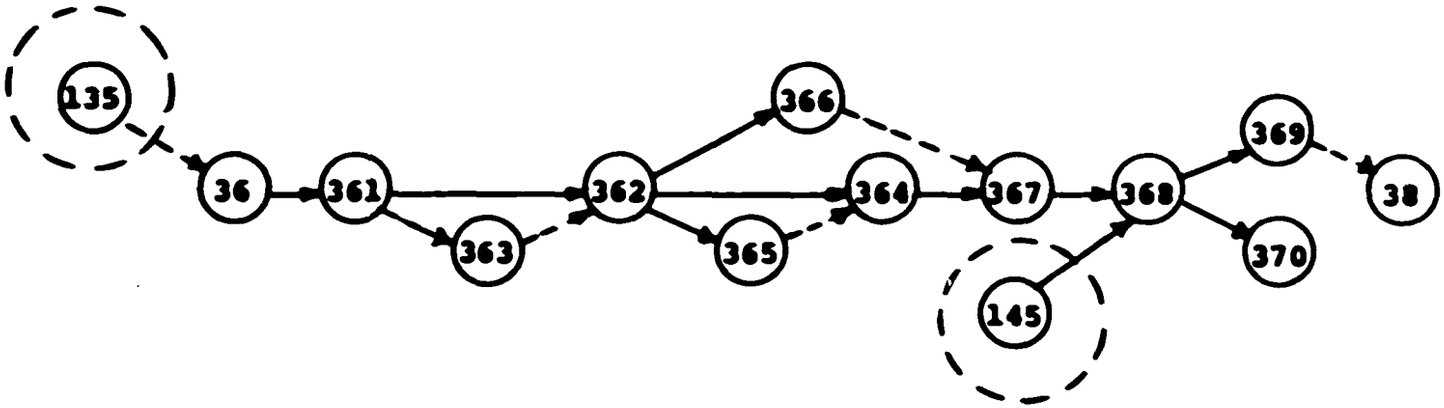
LEVEL III: FIELD APPLICATION WORKSHOP FOR TTP



ACTIVITIES

135	→ 34	Dummy (regional needs identified)
34	→341	Plan workshop program
341	→342	Identify staff
342	→343	Design TLU's
343	→344	Develop TLU's
341	→345	Locate and schedule physical facilities
341	→346	Order instructional resources
343	→346	Dummy (End ordering instructional resources)
346	→344	Receive instructional resources
341	→347	Notify local teachers or workshop
347	→344	Receive word from participating teachers
345	→344	Dummy (Start workshop)
344	→345	Conduct workshop
345	→346	Evaluate workshop
346	→ 40	Submit written report

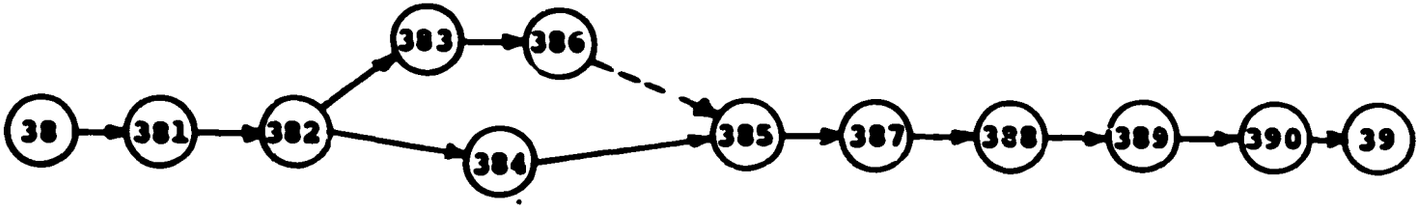
LEVEL III: PROGRAM PLAN FOR A PILOT CENTER



ACTIVITIES

135	→ 36	Dummy (Regional needs determined)
36	→361	Selecting a trainer to be center director
361	→362	Design training program
361	→363	Identify staff of trainers
363	→361	Dummy (Program designed)
362	→364	Schedule workshop
362	→365	Secure facilities
365	→364	Dummy (End scheduling)
362	→366	Order supplies
364	→367	Inform teachers of program
366	→367	Dummy (Start program)
367	→368	Conduct program
368	→370	File final report with TPTT
370	→ 38	Receive pay for professional services
369	→ 38	Dummy (End of pilot)
145	→368	(C.E.U. credit obtained)

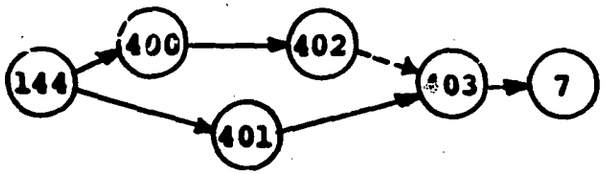
LEVEL III: PILOT PROGRAM CONTRACT FORMULATION AND NEGOTIATION



ACTIVITIES

38	→381	Visit county superintendent
381	→382	Present program to superintendent
382	→383	Superintendent sets up meeting with school board
382	→384	Return to TPTT headquarters
384	→385	Prepare presentation to school board
385	→386	Superintendent writes letter to TPTT confirming meeting
385	→387	Attend school board meeting
387	→388	Revise program
388	→389	Write negotiable contract with aid of a lawyer
389	→390	Visit superintendent to negotiate contract details
390	→39&	Revise contract and budget funds
391	→392	Get final approval and signatures

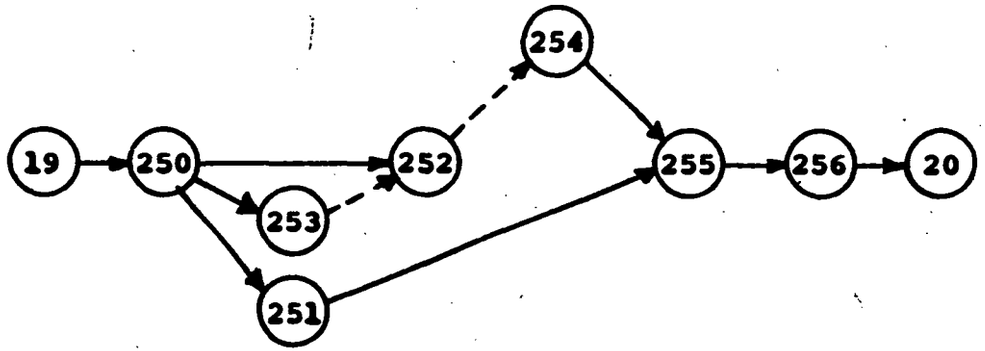
LEVEL III: ASSESSMENT OF PILOT PROGRAM



ACTIVITIES

144 →400	Debrief participants
144 →401	Gather paperwork
400 →402	Visit participants (survey)
401 →403	Rate program
402 →403	Dummy (Finish rating)
403 → 7	Write report (USOE)

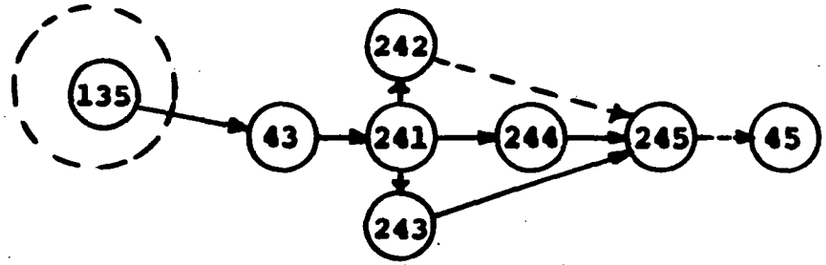
LEVEL III: FIELD TRIPS



ACTIVITIES

19	→250	Decide on field trip location
250	→251	Secure bus
250	→252	Plan schedule
250	→253	Secure location
253	→252	Dummy (Plan schedule)
250	→254	Notify participants
251	→255	Get bus
252	→254	Dummy (Notification)
254	→255	Receive notice from participants
255	→256	Collect money
256	→ 20	Conduct trip

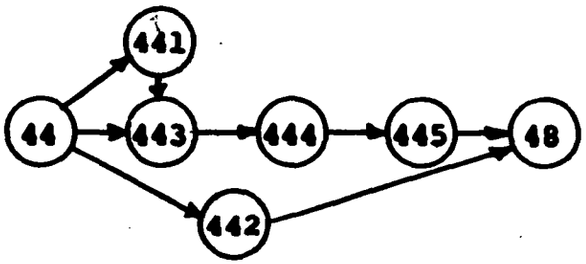
LEVEL III: PROGRAM PLAN FOR A REGIONAL CENTER



ACTIVITIES

135	→ 43	Dummy (Regional needs identified)
43	→241	Selecting a center director
241	→242	Selecting a training staff
241	→243	Identify physical facilities
241	→244	Design training program(s)
244	→245	Identify instructional resources
243	→245	Secure physical facilities
242	→245	Dummy (Trainer needs met)
245	→ 45	Dummy (End of planning)

LEVEL III: SETTING UP REGIONAL CENTERS

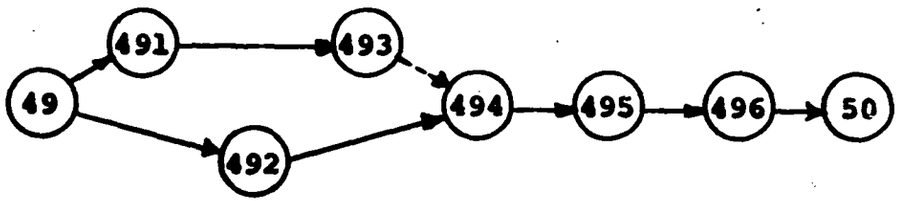


T2

ACTIVITIES

44	→441	Order instructional resources
44	→442	Notify schools of program(s)
44	→443	Move into facilities
441	→443	Receive resources
443	→444	Lay out facilities
444	→445	Set up resources
442	→445	Inform teacher of program details
445	→ 48	Run program(s)

LEVEL III: ASSESSMENT OF REGIONAL PROGRAMS



ACTIVITIES

49	→491	Debrief participants
49	→492	Gather paperwork
491	→493	Visit participants (survey)
492	→494	Rate program
493	→494	Dummy (Finish rating)
494	→495	Compare program rating with others
495	→496	Write final report (USOE)
496	→ 50	Report conclusions to TPTT

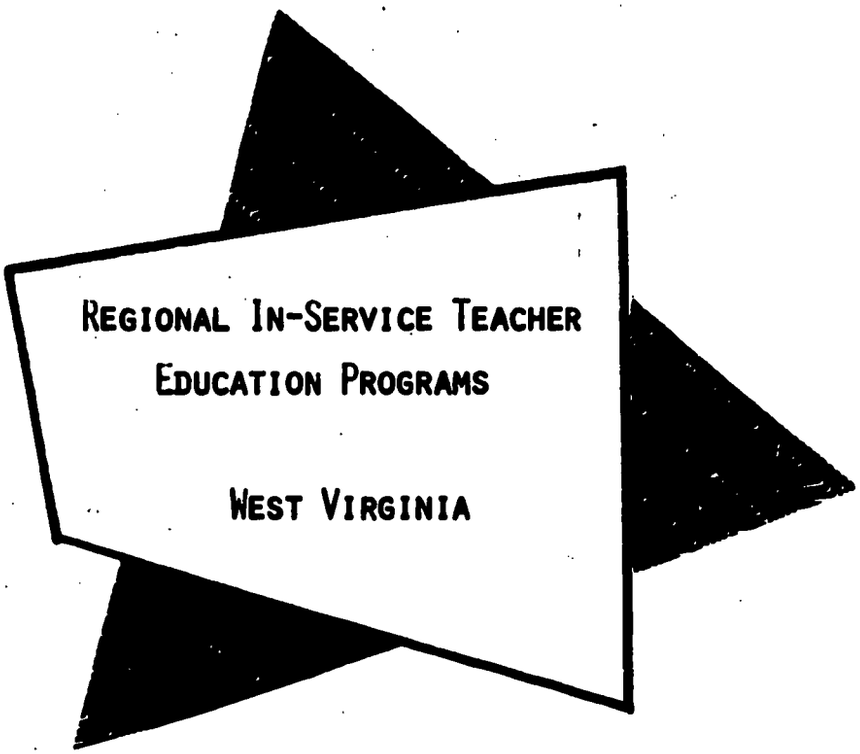
for further information contact:

CURRICULUM RESEARCH & RESOURCE CENTER
2929 University Avenue

West Virginia University | MORGANTOWN, WEST VIRGINIA 26506

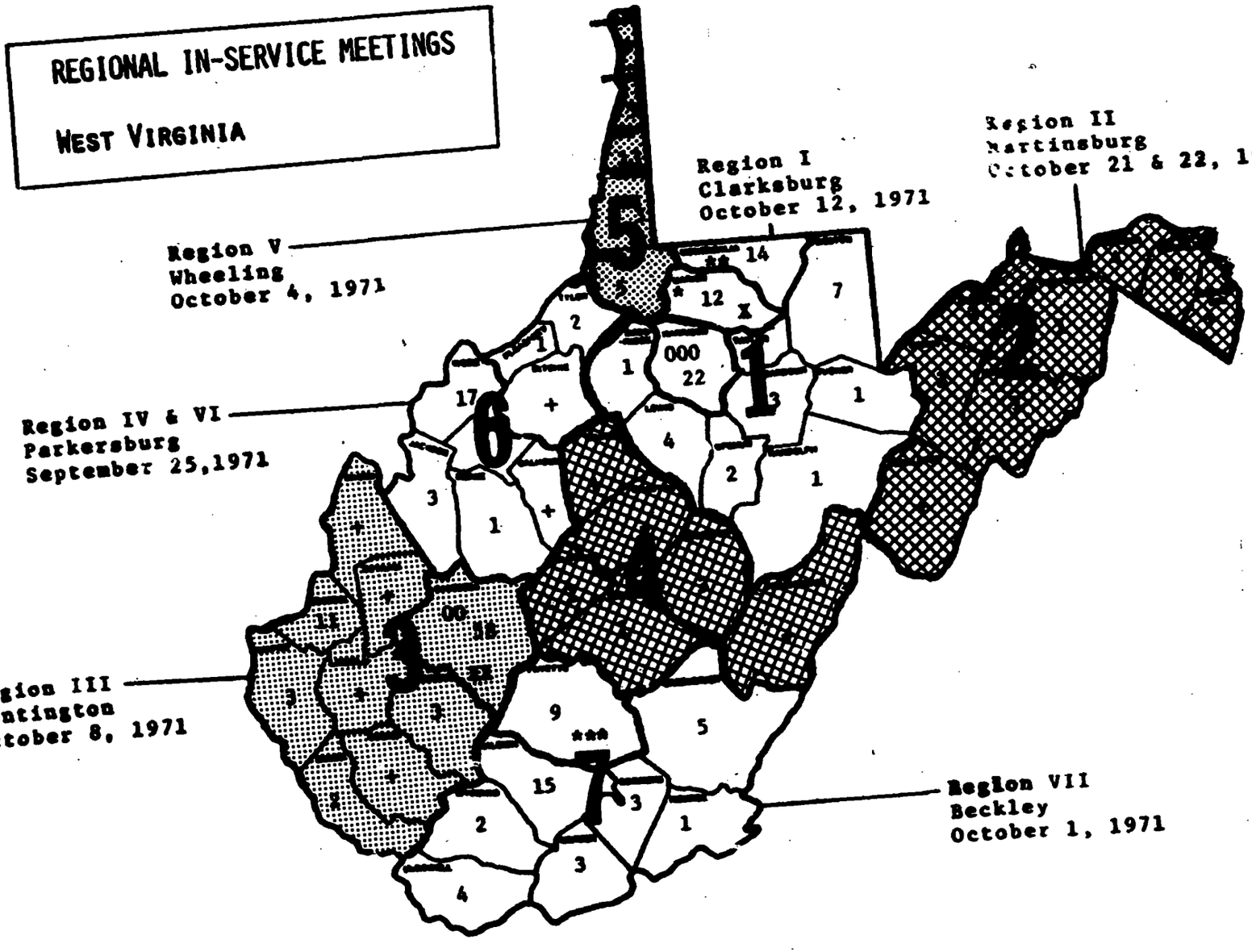
Cover design and layout by ray beauregard.....

APPENDIX B


REGIONAL IN-SERVICE TEACHER
EDUCATION PROGRAMS
WEST VIRGINIA

REGIONAL IN-SERVICE MEETINGS

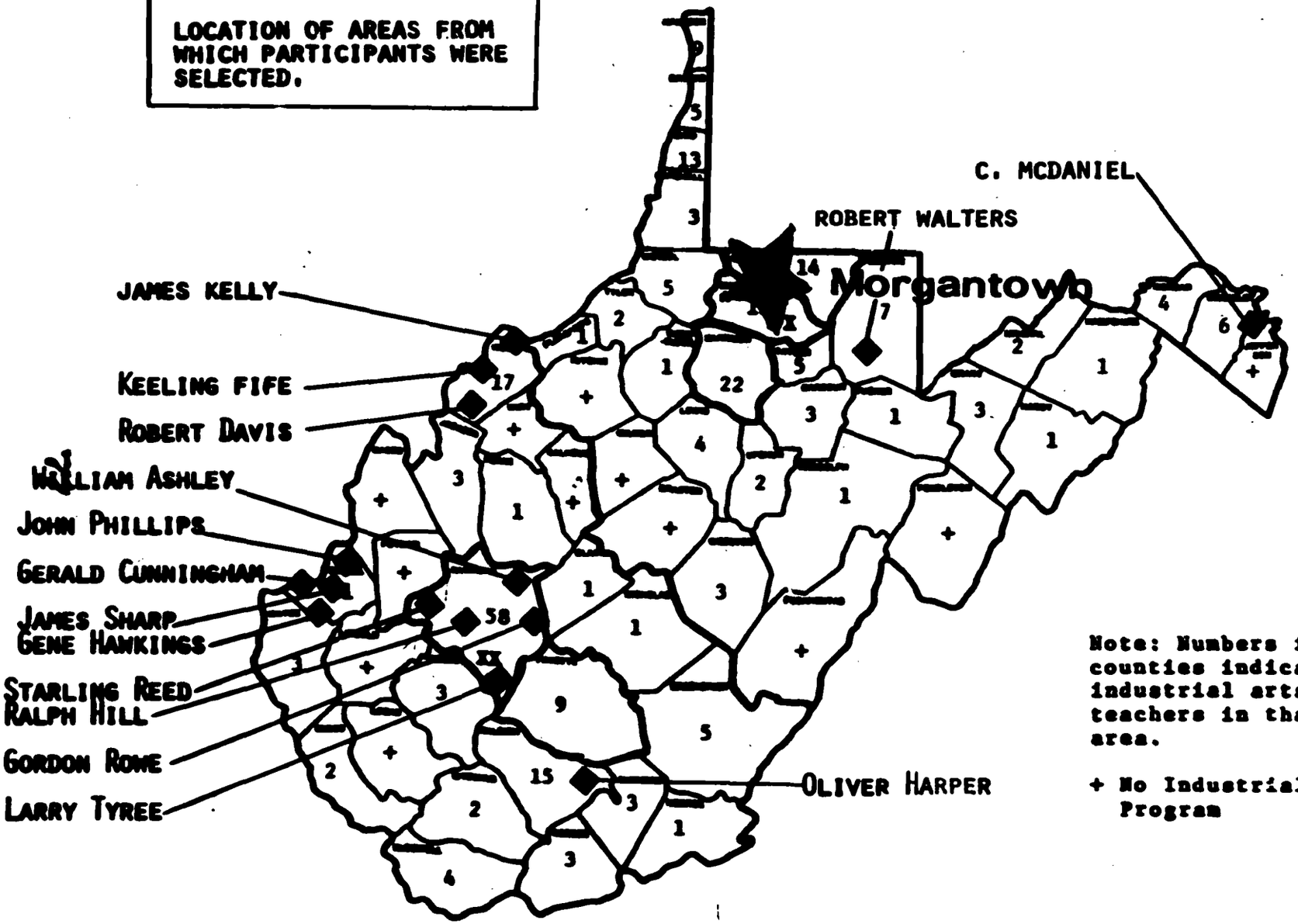
WEST VIRGINIA



APPENDIX C

WEST VIRGINIA

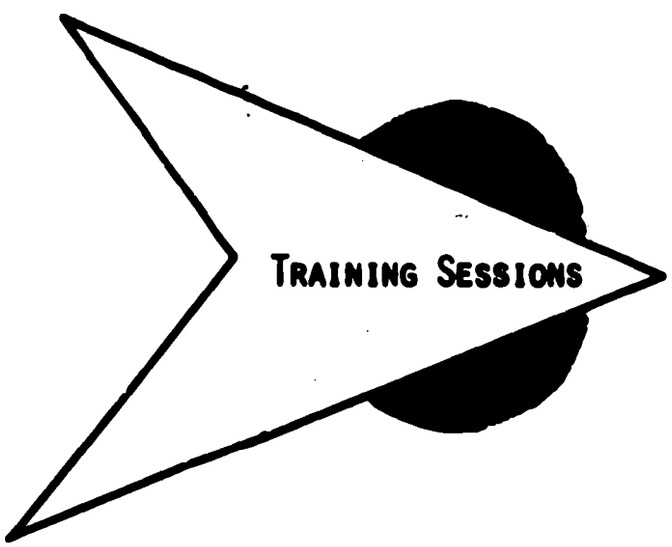
LOCATION OF AREAS FROM WHICH PARTICIPANTS WERE SELECTED.



Note: Numbers in counties indicate industrial arts teachers in that area.

\+ No Industrial Arts Program

APPENDIX D



Training Program for Teachers in the Technologies
"Training-of-Trainers"
West Virginia University
Morgantown, West Virginia

Meeting Place: Mont Chateau State Lodge

Date: February 3 & 4, 1972

A G E N D A

Thursday, February 3, 1972

7:00 p.m.	Social
7:30 p.m.	Welcome: Dr. P. W. DeVore, Director of TPTT; Dr. Jay Barton, WVU Provost of Instruction; Dr. Ralph E. Nelson, Provost of Off-Campus Education; and Dr. Delmas Miller, Dean of the College of Human Resources and Education [P. W. DeVore]
7:45 p.m.	Introductions - staff and participants [P. W. DeVore]
8:00 p.m.	Training Program for Teachers in the Technologies - Past, Present, and Future - Design and Function of Teaching Centers [M. Bender]
8:15 p.m.	Dynamics of Change - The Role of "Change Agents" (Regional Trainers) and Variables Affecting In-Service Teacher Education [P. W. DeVore]
8:45 p.m.	Refreshments (Slides on Regional Meetings) [Tom Alisio]
9:00 p.m.	Basic Teaching Skills - A Programmed Experience (Divide into Four Groups) [Ray Beauregard]
9:30 p.m.	Discussion of Teaching Skills [Edwin Thomas]
9:50 p.m.	Summary of Meeting and Projections [M. Bender]
10:00 p.m.	Meeting Adjourned

Friday, February 4, 1972

7:30 a.m.	BREAKFAST MEETING West Virginia's Comprehensive Educational Program - The Role and Function of Industrial Arts Education (Discussion) [James Snyder, State Industrial Arts Specialist]
9:00 a.m.	Projections -- "The Study of Man and Technology" (The Content Base) [P. W. DeVore]
9:40 a.m.	Overview of Communication Technology and Potential Units (Technical and Social/Cultural) [Ed Thomas]
9:55 a.m.	Overview of Production Technology and Potential Units (Technical and Social/Cultural) [Ron Hull]
10:10 a.m.	Overview of Transportation Technology and Potential Units (Technical and Social/Cultural) [Bill Cupples]
10:25 a.m.	Refreshments
10:40 a.m.	Instructional Resources and Function of CREC [Tom Alizio]
11:00 a.m.	Professional and Methodological Aspects of the Teaching-Learning Process - Precision Teaching through the Development of Teaching-Learning Units [M. Bender]
11:20 a.m.	Discussion - Education in a Technological Society (Less Cost, More Options) (Elect Discussion Leaders) [P. W. DeVore]
12:00 noon	LUNCH (By Discussion Groups)
1:00 p.m.	"Planning for the Future" (Group Discussion) [Ray Beauregard]
2:00 p.m.	Reports by Group Leaders Based upon Consensus of Each Group (Key Ideas, Concepts, Principles, and Suggestions) [Ray Beauregard]
2:30 p.m.	BREAK

2:45 p.m.	SEMINAR - Formulation of Goals and Direction - The Training Program--Specific and Ancillary Activities [P. W. DeVore]
3:45 p.m.	SUMMARY [Ron Hull & P. W. DeVore]
3:55 p.m.	Resource Packages [Tom Alizio]
4:00 p.m.	Meeting Adjourned

TRAINING PROGRAM FOR TEACHERS IN THE TECHNOLOGIES
"Training-of-Trainers"
West Virginia University
Morgantown, West Virginia

Meeting Place: Mont Chateau State Lodge

Date: February 17 & 18, 1972

A G E N D A

Thursday, February 17, 1972		**Recreation Room**
7:00-7:20 p.m.	Social	
7:20-8:00 p.m.	"So You Want to Be a Trainer"	[P. W. DeVore]
8:00-8:30 p.m.	Discussion	[P. W. DeVore M. Bender]
8:30-8:40 p.m.	I.A. Curriculum--Past, Present, Future	[M. Bender]
8:40-9:00 p.m.	Review of Curriculum Structure	[J. Snyder]
9:00-9:10 p.m.	BREAK	
9:10-9:30 p.m.	"Why Study Technology?"	[M. Bender R. Beuaregard P. W. DeVore]
9:30-9:55 p.m.	"How to Prepare Slide Series"	[R. Beauregard]
	"Demonstration on How to Enhance Classroom Presentations through the Use of Visuals"	
9:55-10:00 p.m.	"I", "II", "III" Group Formation and Summary	[M. Bender]

7:30-8:45 a.m. Breakfast

9:00-11:50 a.m. Small Group Sessions

FRIDAY, FEBRUARY 18, 1972 A.M. SCHEDULE

Communications Ed Thomas - Room A	Production Ron Hull, Tom Alizio - Room B	Transportation Bill Cupples - Room C
9:00 -Intro to Communication Technology	9:00 -Production - What Is It?	9:00-9:10 -Intro Transportation Taxonomy
9:10 -General Intro to Graphic Communications	-Kinds of Production -Types of Production	9:10-9:20 -Why Use a Taxonomy 9:20-9:25 -Control Systems
9:20 -High School Photo Silkscreen: The Print Exposing Film Developing & Adhering Removal of Film	9:10 -Manufacturing Concepts 9:20 -Management Concepts 9:30 -Service Concepts 9:40 -Construction Concepts	9:25-9:30 -Propulsion Systems 9:30-9:35 -Suspension Systems 9:35-9:40 -Support Systems 9:40-9:45 -Guidance Systems 9:45-9:50 -Summary
*GROUP ROTATION	*GROUP ROTATION	*GROUP ROTATION

*Group Rotation Every 50 Minutes as Indicated Below

	9:00-9:50	10:00-10:50	11:00-11:50
Group I	Room A Communications	Room B Production	Room C Transportation
Group II	Room B Production	Room C Transportation	Room A Communications
Group III	Room C Transportation	Room A Communications	Room B Production

11:50-1:00 - LUNCH

Friday, February 18 (P.M.)

1:00-1:15	General Discussion & Formulation of Field Teams [P. W. DeVore]
1:20-3:40	Small Group Specialized Sessions as Follows:

Communication Program (Room "A")

1:20-1:50	Film - "Why ?"
1:50-2:10	Discussion--Impact of Communication on Modern Society
2:10-2:20	Components of Communication Technology
2:20-2:40	History of Radio (Technical Emphasis)
2:40-3:30	High School History of Radio Unit - Lodestone - Amber Rod -Electromagnet -Code Telegraph -Crystal Radio
3:30-3:45	Introduction to Teaching the Triode Amplifier

Production Program (Room "B")

1:20-1:30	"So You Want to Produce a Rocket ?" "Design--Cost--Time"
1:30-1:40	Establish Next Four Units -Cost Analysis -Decision Making -Material and Layout -Actual Production
1:40-2:00	Organizing for Production
2:00-2:10	Designing for Production

2:10-2:20	The Relationship of Production to -- -Communications -Transporattion
2:20-2:30	BREAK
2:30-2:35	Introduce Game (Process Flow)
2:35-3:35	Game Time
3:35-3:45	Evaluation of Game

Transportation Program (Room "C")

1:20-1:30	Introduction to Model Rocketry
1:30-1:50	History of Rocketry
1:50-2:05	Why Teach Model Rocketry in the Classroom?
2:05-2:20	Identification of Resources for Model Rocketry
2:20-2:45	Discussion - Unit in Transportation Technology that May Be Contained in a Model Rocketry Unit
2:45-2:55	Introduction to Propulsion Systems
2:55-3:05	Piston Engines
3:05-3:15	Turbojet Engines
3:15-3:25	Ramjet Engine
3:25-3:35	Pulsejet Engine
3:35-3:40	The Model Rocket Engine
3:40-3:45	Summary of Propulsion Systems

3:45-4:00	Summary & Conclusions (Recruation Room)

TRAINING PROGRAM FOR TEACHERS IN THE TECHNOLOGIES
"Training of Trainers"
West Virginia University
Morgantown, West Virginia

Meeting Place: Mont Chateau
State Lodge

Date: March 2 & 3, 1972

A G E N D A

Thursday, March 2, 1972

7:00-7:30	Social	
7:30-7:40	Review of Agenda "Where Are We Now-- Where Are We Going"	[R. Beauregard]
7:40-8:30	Panel Discussion "Technology-- Change--Education"	[R. Beauregard M. Bender P. DeVore]
8:30- :50	Precision Teaching TLU's	[M. Bender]
8:50-9:00	BREAK	
9:00-9:30	Education-Accountability "Behavioral Objectives"	[P. DeVore]
9:30-10:00	Learning Skills Game	[R. Beauregard]

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7:30-8:45 a.m. Breakfast

FRIDAY, MARCH 3, 1972

9:00-11:00 a.m. Small Group Sessions

Communications Ed Thomas - Room A	Production R. Hull, T. Alizio - Room B	Transportation Bill Cupples - Room C
9:00-9:10 - Introduction to Electronics Communications	9:00-9:10 - Management -Definitions -Functions	9:00-9:30 - Terrestrial Transport Systems -Railroad -Automobile -High Speed -Etc.
9:10-9:20 - History of Electronic Communication (to 1910)	9:10-9:20 - Planning	
9:20-9:40 - Application to Classroom (Discussion)	9:20-9:30 - Assemble Resources	9:30-9:50 - Informal Discussion (Application to Classroom)
9:40-9:50 - Swing Time	9:30-9:40 - Organize	
	9:40-9:45 - Direct	
	9:45-9:50 - Control	
*Group Rotation	*Group Rotation	*Group Rotation

*group rotation every 50 minutes as indicated below

	9:00-9:50	10:00-10:50	11:00-11:50
Group I	Room A Communications	Room B Production	Room C Transportation
Group II	Room B Production	Room C Transportation	Room A Communications
Group III	Room C Transportation	Room A Communications	Room B Production

Friday, March 3, 1972 (P.M.)

1:00-3:30	Small Group Specialized Sessions as Follows:

COMMUNICATIONS PROGRAM (ROOM "A")

1:00-1:20	Construction of Crystal Receiver
1:20-1:40	Construction of Triode Amplifier
1:40-2:00	Classroom Application (discussion)
2:00-2:05	BREAK
2:05-2:55	Basic Electricity (Commercial Units) (Demonstration and Usage)
2:55-3:00	BREAK
3:00-3:30	Unit Design (including performance objectives)

PRODUCTION PROGRAM (ROOM "B") Theme: Model Rocket Production

1:00-1:30	Write Performance Objectives
1:30-1:40	Select Best Objective
1:40-1:50	Choice-Rocket Design
1:50-2:00	Select Production Plan -Organization -Process Flow
2:00-2:10	BREAK
2:10-2:50	Cost Analysis Worksheet
2:50-3:30	Illustrate Breakeven Analysis

TRANSPORTATION PROGRAM (ROOM "C")

1:00-1:10	Introduction to Propulsion Systems
1:10-1:45	Types of Propulsion Systems
1:45-2:00	Resources for Model Rocketry
2:00-2:30	Laws of Physics

2:30-2:45	Potential Unit for Model Rocketry
2:45-3:30	Work Period - Formulation and Discussion of Performance Objectives
3:30-3:55	BREAK
3:35-3:55	Selected Individuals Reporting on Their Behavioral Performance Objective [P. W. DeVore]
3:55-4:00	Summary and Travel Vendors

NEXT MEETING

MARCH 23 & 24, 1972

APRIL 26-MAY 31, 1972 - FIELD APPLICATION

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TRAINING PROGRAM FOR TEACHERS IN THE TECHNOLOGIES
"Training of Trainers"
West Virginia University
Morgantown, WV 26506

Meeting Place: Mont Chateau State Lodge

Date: March 23 & 24, 1972

A G E N D A

Thursday, March 23, 1972

7:00-7:30	Social
7:30-7:35	Review of Agenda [M. Bender]
7:35-8:30	Programmed Instruction [J. Snyder]
8:30-9:10	Panel Discussion - "Development of TLU's for Field Application Phase" [M. Bender, R. Beauregard, G. Hawkins, L. Tyree, E. Thomas]
9:10-9:30	"The Role of Simulation & Games in Industrial Arts [T. Alizio]
9:30-10:00	"Game Time" -Ethics -Settle or Strike -Future [R. Breauregard, T. Alizio] [R. Hull]

****

7:30-8:45 a.m. -- Breakfast
9:00-11:50 a.m. -- Small Group Sessions

FRIDAY, MARCH 24, 1972

9:00-9:10 - The telephone in communications 9:10-9:20 - The Bell Systems in television & satellite communication 9:20-9:25 - Solar batteries in communications 9:25-9:30 - Satellite communication physics 9:30-9:50 - Methods of incorporating communication technology in the industrial arts laboratory	9:00-9:20 - Construction Concepts -Prefabrication -Modular -System 9:20-9:45 - Service Concepts -Timing -Installation -Maintenance -Diagnosis -Alteration 9:45-9:50 - Discussion and Summary	9:00-9:10 - Marine Transportation Technology 9:10-9:20 - Air Transportation Technology 9:20-9:30 - Aerospace Transportation Technology 9:30-9:40 - Discussion: "Implementation of Transportation Concepts in Industrial Arts"
*Group Rotation	*Group Rotation	*Group Rotation

*Group rotation every 50 minutes as indicated below

	9:00-9:50	10:00-10:50	11:00-11:50
Group I	Room A Communications	Recreation Room Production	Suite 229 Transportation
Group II	Recreation Room Production	Suite 229 Transportation	Room A Communications
Group III	Suite 229 Transportation	Room A Communications	Recreation Room Production

Friday, March 24, 1972 (P.M.)

1:00-3:45	Small Group Specialized Sessions as Follows:

COMMUNICATIONS PROGRAM (ROOM "A")

1:00-1:10	Advantages of Printed Circuits in Communications
1:10-1:20	Construction of Printed Circuits in Industry and the Industrial Arts Laboratory
1:20-2:00	Producing a Circuit for a Crystal Radio Using a Copper Clad Printed Circuit Board
2:00-2:10	Printed Circuit Board Construction in the Space Industry
2:10-2:20	Communications between Earth and Space Vehicles
2:20-2:30	Life Support Systems in Space Capsules
2:30-2:40	On-Board Medical Tests
2:40-2:50	On-Board Computer Functions
2:50-3:00	Power Supplies for Use in Space
3:00-4:00	Work on Design of TLU's for Field Application Phase

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PRODUCTION PROGRAM (RECREATION ROOM)

1:00-1:20	Rocket Material Accounting
1:20-1:50	Preparation of TLU's for Field Application Phase -Time Frame -Title of Units -Objectives
1:50-2:20	Identification of Field Application Needs -Hardware -Software
2:20-2:30	BREAK
2:30-3:00	Layout Analysis and Principles.

3:00-3:30	Application to Rocket Production
3:30-3:45	Summary

TRANSPORTATION PROGRAM (SUITE 229)

1:00-1:20	Review - Rocket Propulsion and Newton's Laws of Motion
1:20-2:00	Rocket Structures
2:00-2:40	Demonstration: "McKnight Power Experimenter"
2:40-2:50	Introduction to Unit Formation for Field Application Phase
2:50-3:10	Power Technology Unit (Bob Walters)
3:10-3:20	BREAK
3:20-3:45	Work Session - Development of TLU's for Field Application -Determine What Hardware and Software Is Needed for Each Unit
3:45-4:00	Refreshments and Summary [Recreation Room]

NEXT MEETING

April 6, 7, and 8, 1972

APRIL 26-May 31, 1972 - Field Application

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TRAINING PROGRAM FOR TEACHERS IN THE TECHNOLOGIES
"Training of Trainers"
West Virginia University
Morgantown, West Virginia

Meeting Place: Mont Chateau State Lodge

Dates April 6, 7, & 8, 1972

A G E N D A

Thursday, April 6, 1972

7:00-7:30	Social	
7:30-7:35	Review of Agenda	[M. Bender]
7:35-7:50	Federal and State Aid for Industrial Arts	[J. Snyder]
7:50-8:05	Procedures in Writing and Submitting Proposals	[J. Snyder P. W. DeVore]
8:05-9:00	"Learning Skills Game"	[R. Beauregard]
9:00-9:45	Technology and Ecology	[P. W. DeVore]
9:45-10:00	Discussion	

Friday, April 7, 1972

7:30-8:45	Breakfast
9:00-11:45	Specialized Area Sessions
11:45-1:00	Lunch
1:00-3:45	Specialized Area Sessions

COMMUNICATIONS PROGRAM (ROOM A)

9:00-9:15	Introduction and Presentation of a ten-minute TLU on the concept of "Sound Transmission" by George Maughan

9:15-9:30	Discussion on the development of TLU's
9:30-10:25	Demonstration of Classroom Instructional Equipment for Communication (Hickok)
10:25-10:35	Break
10:35-11:30	Photo-silkscreening of printed circuit boards (Thompson and LaFauci)
11:30-11:50	Introduction to computer basics -Analog -Digital
11:50-1:00	Lunch
1:00-1:15	Analog computer construction and operation in the classroom
1:15-1:30	Digital computers for the classroom
1:30-2:00	Operation of basic digital logic simulation by each trainer
2:00-2:30	Position determination by traingulation theory
2:30-3:00	Solving problems in triangulation
3:00-3:45	Work session on preparation of TLU's for field application
3:45-4:00	Refreshments

PRODUCTION PROGRAM (ROOM F)

9:00-9:15	Introduction and presentation of a 10-minute TLU on the concept of "Flow Process" by Charles Campbell
9:15-9:30	Discussion of TLU
9:30-9:35	Introduction of model rocket production unit
9:35-9:45	Set-up production line
9:45-11:15	Produce rocket

11:15-11:30	Clean up
11:30-11:50	Discussion -- Application to field production unit
11:50-1:00	Lunch
1:00-1:30	Model rocket production
1:30-2:10	Work session - Development of TLU's for field application phase
2:10-2:20	Break
2:20-3:45	Work session - TLU's
	Note: Additional instruction will be provided on demand in other areas if time permits.
3:45-4:00	Refreshments

TRANSPORTATION PROGRAM (ROOM C)

9:00-9:15	Introduction and presentation of 10-minute TLU on the concept of "Hydrofoil Suspension" by Jim Pokrzywa
9:15-9:30	Discussion of above unit
9:30-9:45	Review materials - astronautics unit
9:45-9:55	Launch systems
9:55-10:05	Recovery systems
10:05-10:15	Life support systems
10:15-10:30	Break
10:30-10:45	Safety - model astronautics
10:45-11:45	Work session - TLU's
11:45-1:00	Lunch
1:00-1:45	Internal combustion converters
1:45-2:00	Break
2:00-2:45	Demonstration: I.C.E. Analysis System

2:45-3:45	Work session - TLU's	
3:45-4:00	Refreshments	

Friday Evening, April 7, 1972

7:30-8:30	"Industrial Arts in the Elementary School"	[Ed Thomas, [chairman] Becky Newbrough Sue Riggs Tom Alizio]
8:30-9:15	"Integrated Aerospace Unit in Industrial Arts" (panel discussion)	[M. Bender R. Hull E. Thomas B. Cupples P. W. DeVore]
9:15-10:00	Discussion on Field Application	[R. Beauregard]

Saturday, April 8, 1972

7:30-8:30	Breakfast (at Mont Chateau)	
8:30-9:00	Drive to Morgantown	
9:00-9:45	Orientation to model airplane and airship unit for industrial arts (Room 801, Forestry Tower, on the Evansdale Campus	[David Kimble Ron Peterson]
9:45-10:30	Model airplane and airship demonstrations	[David Kimble Ron Peterson]
10:30-11:30	Participants' rocket launch	[R. Beauregard]
11:30-12:00	Tour & Lunch - CRRC	[T. Alizio]

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Next meeting - April 20 & 21, 1972

TRAINING PROGRAM FOR TEACHERS IN THE TECHNOLOGIES
"Training-of-Trainers Program"
West Virginia University
Morgantown, West Virginia

Meeting Place: Mont Chateau
State Lodge

Date: April 20-21, 1972

A G E N D A

Thursday, April 20, 1972

7:00-7:30	Social
7:30-7:45	Review & Planning Agenda for the Weekend [Bender]
7:45-8:15	General Discussion: "Training Programs for the Future" [DeVore]
8:15-8:30	Discussion - Graduate Study WVU

Thursday, April 20, 1972

8:30-10:00 p.m.: Multiple Activities and Work Session (See Schedule)

GROUP	TIME	COMMUNICATIONS Ed Thomas Room "A"	PRODUCTION Ron Hull Suite 229	TRANSPORTATION Bill Cupples Room "C"	VIDEO TAPE ON TLU Tom Alizio Rec Room	35MM SLIDE FOR TLU Ray Beauregard Rec Room
"A"	8:30-8:45	Ralph Hill	Starling Reed	Bill Ashley	Group "B"	Members in Group "A" when not being counseled on TLU's
	8:45-9:00	Larry Tyree	Oliver Harper	Jim Kelley		
	9:00-9:15	Robert Davis	Gordon Rowe	Jim Sharp		
"B"	9:15-9:30	Gerald Cunningham	Eugene Hawkins	Bob Walters	Group "A"	Members in Group "B" when not being counseled on TLU's
	9:30-9:45	Charles McDaniel	John Phillips	Available on Demand		
	9:45-10:00	Available on Demand	Keeling Fife	Available on Demand		

(a) Note: DeVore and Bender will be available for further consultation on TLU Development.

(b) After each 15-minute review session on Thursday evening, the trainer and the area specialist will determine whether the TLU is ready for presentation on Friday morning. If the unit is not completed according to the format, he should follow the attached Friday morning schedule or adjusted schedule to meet individual needs prior to presentation of TLU.

Friday, April 21, 1972

7:30-8:30 - Breakfast
8:30-8:45 - Guideline for Training Program Evaluation

BLOCK	1	2	3	4	5
TIME	COMMUNICATIONS Ray Beauregard Room "A"	PRODUCTION Ron Hull Room "B"	TRANSPORTATION Bill Cupples Room "C"	CRRC RESOURCE MATERIAL Tom Alizio Rec Room	PRESENTATION OF TLU Bender & DeVore Rec Room
8:45-9:15	Larry Tyree	Oliver Harper	Bill Ashley		
9:15-9:45	Ralph Hill	Starling Reed	Jim Sharp		
9:45-10:15	Gerald Cunningham	John Phillips	Jim Kelley	Assistance provided in the identification of content for TLU's.	Presentation of TLU if not in block 1, 2, 3, or 4. [Sign-up sheet attached]
10:15-10:45	Robert Davis	Eugene Hawkins	Bob Walters		
10:45-11:15	Charles McDaniel	Gordon Rowe	Available for Slides or Photo.		
11:15-11:45	Available on Demand	Keeling Fife	Available for Slides or Photo.		

Friday, a.m., April 21, 1972

Sign-up Sheet for Block 5: TLU Presentation Schedule

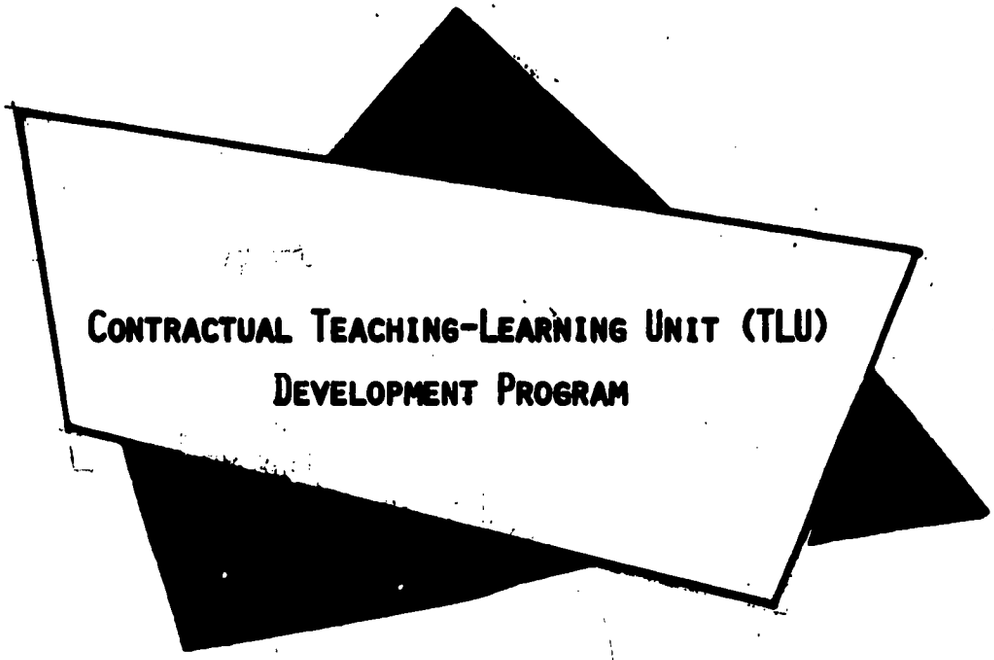
[Sign your name on one of the lines only if the area specialist has approved your TLU for presentation.]

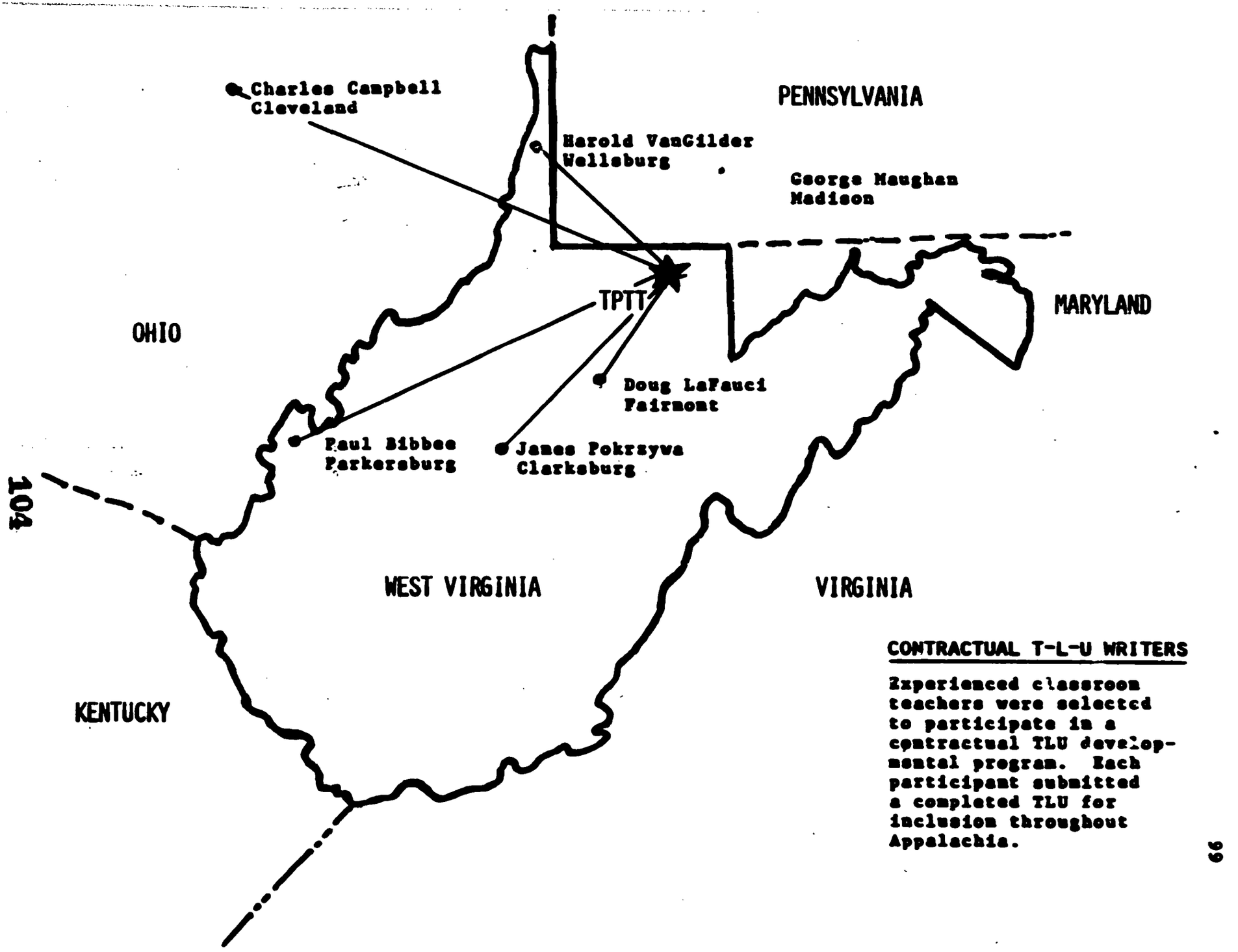
TIME	PRESENTER	TOPIC
8:45-9:00		
9:00-9:15		
9:15-9:30		
9:30-9:45		
9:45-10:00		
10:00-10:15		
10:15-10:30		
10:30-10:45		
10:45-11:00		
11:00-11:15		
11:15-11:30		
11:30-11:45		
11:45-1:00	Lunch [Small Group "TPTT" Evaluation]	
1:00-1:15		
1:15-1:30		
1:30-1:45		

NOTE: [Each presenter will be limited to ten minutes, followed by a five-minute question and answer period.]

1:00-2:00	Taping of Evaluation Reports [Four reports--15 mins. each]	R. Beauregard [Room C]
1:00-1:15	_____	The reporters will be selected by each of the four groups during lunch hour.
1:15-1:30	_____	
1:30-1:45	_____	
1:45-2:00	_____	
1:45-2:30	Discussion on the TLU presentations	DeVore & Bender
2:30-3:00	Discussion and scheduling of field application phase	Snyder & Bender
3:00-3:15	Training Program Summary	DeVore
3:15-3:30	Refreshments	
3:30-4:30	M.A. Test	

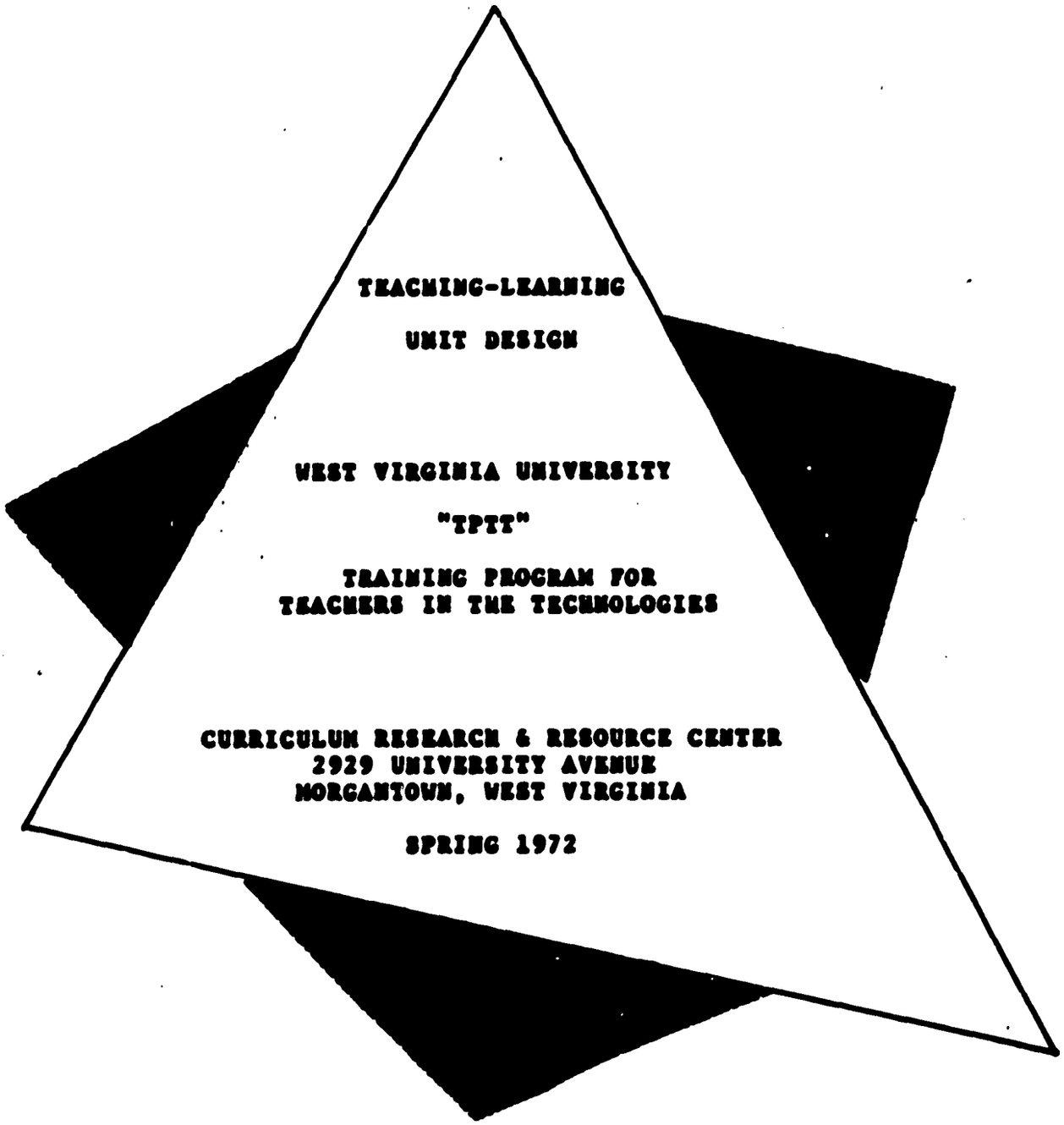
APPENDIX E


CONTRACTUAL TEACHING-LEARNING UNIT (TLU)
DEVELOPMENT PROGRAM



CONTRACTUAL T-L-U WRITERS

Experienced classroom teachers were selected to participate in a contractual TLU developmental program. Each participant submitted a completed TLU for inclusion throughout Appalachia.



TEACHING-LEARNING

UNIT DESIGN

WEST VIRGINIA UNIVERSITY

"TPTT"

TRAINING PROGRAM FOR
TEACHERS IN THE TECHNOLOGIES

CURRICULUM RESEARCH & RESOURCE CENTER
2929 UNIVERSITY AVENUE
MORGANTOWN, WEST VIRGINIA

SPRING 1972

TLU FORMAT ©

PROGRAM FOR THE STUDY OF TECHNOLOGY
AND HUMAN RESOURCE DEVELOPMENT

West Virginia University
Morgantown, West Virginia

Background Information

Technology is an area of human knowledge, as are the sciences and the humanities, and is an endeavor common to all mankind. By emphasizing the relationship of man and technology, we are concerned with the human elements in the body of knowledge and with man as the creator of this knowledge.

The industrial arts curriculum based upon the study of man and technology -

1. provides a base from which to implement the purposes and objectives of general education;

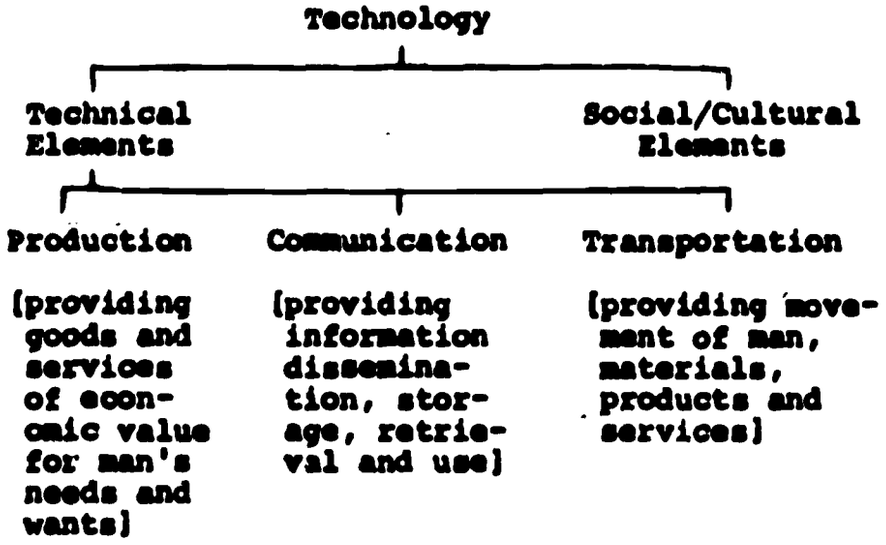
2. is not limited or isolated by geographical boundaries, thereby evidencing the true nature of disciplined inquiry;

3. is concerned with man, regardless of national origin, as the creator of technology;

4. provides a meaningful relation between technology and man's culture; and

5. identifies a knowledge area meeting the criteria of a discipline in the trust sense of the term.

A taxonometric structure for the study of man and technology identifies three major areas of technological endeavor. It incorporates both social/cultural and technical elements of man's creative endeavor in meeting the needs of individuals and cultures in the areas of production, transporation and communication.



Educational Foundations

1. A discipline and structure of knowledge base. Content derived from the technologies including man's modes of thinking, doing and acting in the technologies.

2. Man and Technology - a central theme throughout the history of man. The base of modern society.

3. An intellectual discipline. A cumulative knowledge base.

4. "What to teach" must be determined before one engages in "how to teach."

Objectives

1. Based upon objectives derived from:

   a. the discipline of technology - a cumulative knowledge base

   b. educational objectives (local, state, national, individual)

   c. instructional objectives -

2. Concerned with:

   a. adaptability to technological change

   b. intelligent citizenship in a participatory democracy in a post-industrial age

c. valuing and knowing about technology as a major force in our culture

d. educating youth for a culture dominated by technology

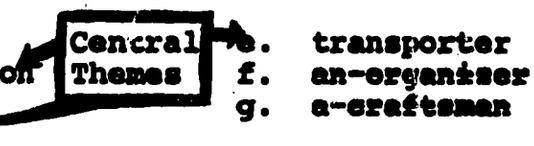
Objectives are related to the basic tenets of technology.

3. Technology is

a. problem oriented
b. future oriented
c. activity oriented
d. environmentally centered

Content Emphasis

1. The content base for industrial arts is Technology (with a capital T). A study of the past, an analysis of the present and a projection to the future identifies man as



a. a builder
b. a communication
c. a producer
d. a developer
e. transporter
f. an organizer
g. a craftsman

(The areas crossed out have subsumed in the classification under communications, transporation and production).

2. Emphasis is on man as the creator of the Technology including innovation, invention, history, contemporary problems, projected solutions, etc.

3. Each of these areas identifies a vast storehouse of technics and knowledge which form the core elements (both technical and social/cultural) of the discipline of technology.

4. The resulting structure is externally stable yet internally flexible and adaptable to change.

Grade Level and Basic Content

1. The elementary school years would include a broad program articulated and integrated with the total elementary school curriculum.

2. The junior high school program is based on the knowledge area of production with the manufacturing area as the content field. The senior high school program includes the study of construction, communication and transportation technologies as well as the social/cultural relationships with opportunity for study in any one or all of the areas.

3. The program would be for all students. It is proposed that the time devoted to the various disciplines be: 1/3 science; 1/3 technology; 1/3 humanities. Program is and must be interdisciplinary in nature. It will require a true teacher-scholar, not a craftsman.

NOTE: This program, rationale and structure will be used together with the T-L unit format in this contractual program.

TLU FORMAT*

West Virginia University
Training Program for Teachers
in the Technologies

(1) Title of Unit: _____

(2) Learning Area: _____

(3) Grade Level(s): _____ (4) Time Required: _____

(5) Name of Designer: _____ (6) TLU Completion Date: ____

(7) LEARNING HIERARCHY:

(a) Taxonometric Structure -

(b) Subordinate Hierarchy for TLU -

* Teaching-Learning Unit

(8) New Terms & Definitions -

(9) Purpose of Unit -

(10) Technological Concept(s) to Be Taught - (See pp. 120-121)

(11) Educational Objectives -

(12) Program Objective(s) - (See pp. 114-116)

(13) Curriculum Objective(s) - (See p.117)

(14) Instructional Objective(s) - (See p.118)

(15) Performance Objective(s) - (See p.119)

(16) Evaluation & Assessment -

(17) Procedure for Teaching Unit (Precise Directions for Implementing the T-L Unit) -

(18) Outline of Unit -

(19) Student Activities -

(20) Summary & Conclusions -

TLU -- DEFINITIONS & GUIDELINES

1 - Title of Unit: A short, concise title of unit.

2 - Learning Area: One of the three major areas of man's technological endeavors; communication, production or transportation.

3 - Grade Level(s): Recommended grade level the teaching-learning unit is designed for.

4 - Time Required: Average length of time it takes to teach the unit (in minutes).

5 - Name of Designer: Your full name.

6 - TLU Completion Date: The date the designer completed the unit with corrections and revisions.

7 - Learning Hierarchy: (a) illustrate on a taxonometric basis the unit's relationship to one of the three areas of technology (communication, production, or transportation). (b) development of a precision subordinate hierarchy of intellectual skills (concrete to abstract concepts) which will provide the most efficient learning sequence for the attainment of the objectives of the teaching-learning unit

8 - New Terms & Definitions: Identify, list and define the new terms or concepts as they relate to the unit.

9 - Purpose of Instructional Unit: Short statement on how the unit will contribute to the course and curriculum objectives.

10 - Technological Concept(s) to Be Taught: List conceptual schemes, concepts, either concrete or defined, to be taught through this unit. The concepts may be illustrated by visuals, diagram, working drawing of models, etc.

11 - Educational Objective(s): Those objectives stated in broad comprehensive terms which relate to the goals of education in the society.

12 - Program Objective(s): An objective which identifies experiences, services, and/or facilities to be offered to any individual within a school.

13 - Curriculum Objective(s): An objective which identifies a skill(s), a concept(s), or an attitude(s) to be developed by a student who participates in a selected set of experiences or activities.

14 - Instructional T-L Unit Objective(s): A statement describing the desired outcomes of the specific teaching-learning unit.

15 - Performance Objective(s): These objectives are precise descriptions of educational goals in terms of desired behaviors, outcomes, or material items which can be reliably, validly and objectively measured. Two types of performance objectives are "product" and "process."

(a) Product objectives refer to an expected behavior -- cognitive, affective, or psychomotor.

(b) Process objectives refer to the direct or indirect means by which the product is obtained.

The performance objective indicates the time or pre-requisites necessary to bring about a desired behavior and the expected proficiency level to be attained by the learner in attainment of the concept to be taught.

A Behavioral Objective + Elements [Time or pre-requisite] [Proficiency Level] =

A Performance Objective

16 - Evaluation & Assessment: Develop and clearly define evaluation and assessment procedures for each instructional objective (entry, enroute, terminal).

17 - Procedure for Teaching Unit: List and describe the sequential order in which the unit is to be taught. This should specify what the teacher will be doing and what the learner will be doing. Instruction must be precise enough so others, without further instruction, can implement the unit.

18 - Outline of Unit: Outline the unit and describe procedure to be used to introduce the unit which will motivate the learner. Through the use of advanced organizers, illustrate its relationship to common areas.

19 - Student Activities: Specify in detail what the student will be doing to facilitate learning. There may be a variety of activities from reading assignments to the designing and fabricating a model. (be specific)

20 - Summary & Conclusions: Write out a summary for the unit which will tie together the concepts taught to show their interrelationship.

ADDITIONAL INFORMATION
TLU FORMAT

(1) Equipment, Supplies, Devices, Models, Etc. -

(2) Application of Concepts and Areas for Further Study -

(3) Designer's Field Application & Assessment of Teaching-Learning Unit (Written Report) -

(4) Basic References & Bibliography -

(a) Student -

(b) Teacher -

ADDITIONAL INFORMATION ON TLU

(1) Equipment, Supplies, Devices, Models, Etc.: A complete list of equipment and supplies, etc., needed to teach this unit along with cost and suppliers if special equipment is required.

(2) Application of Concepts and Area for Further Study: Determine and illustrate how the concepts from this unit can be related to other areas or disciplines (math, science, social studies, humanities, etc.) of study. This would demonstrate the "universal" aspect of concepts taught. Include supplemental references if needed.

(3) Designer's Field Application & Assessment of Teaching-Learning Unit (Written report): After the unit is completed, use it in your classroom for the purpose of evaluating the unit in the "real world". Prepare a written summary of the application and assessment phase. What was the students' performance and teacher's reaction?

(4) Basic References & Bibliography: (a) Student - List specific text or reference book to be used by the student. Also additional references which a student may use for independent study, etc. (b) Teacher - List specific references that a teacher may use for further study.

LEVELS OF OBJECTIVES[1]

For the purposes of this presentation and, more realistically, working with CEP, four levels of objectives have been identified, stratified, purified, and clarified: Policy, Program, Curriculum, and Instruction. Definitions which apply to these four terms are as follows:

1.	Policy Objective:	An objective which identifies a procedure or practice to implement an authorized statement of policy.
2.	Program Objective:	An objective which identifies experiences, services, and/or facilities to be offered to any individual within a school or school system.
3.	Curriculum Objective:	An objective which identifies a skill(s), a concept(s), or an attitude(s)to be developed by a student who participates in a selected set of experiences or activities.
4.	Instructional Objective:	An objective which identifies a behavior which a student shall be expected to exhibit as a result of instruction.

The above in effect creates a stratified system which under an ideal situation precipitates from Policy to Instruction. With the downward movement, there is also broadening and expansion as demonstrated by Figure 1.

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[1] Comprehensive Education Program, West Virginia State Department of Education (Revised 1970)

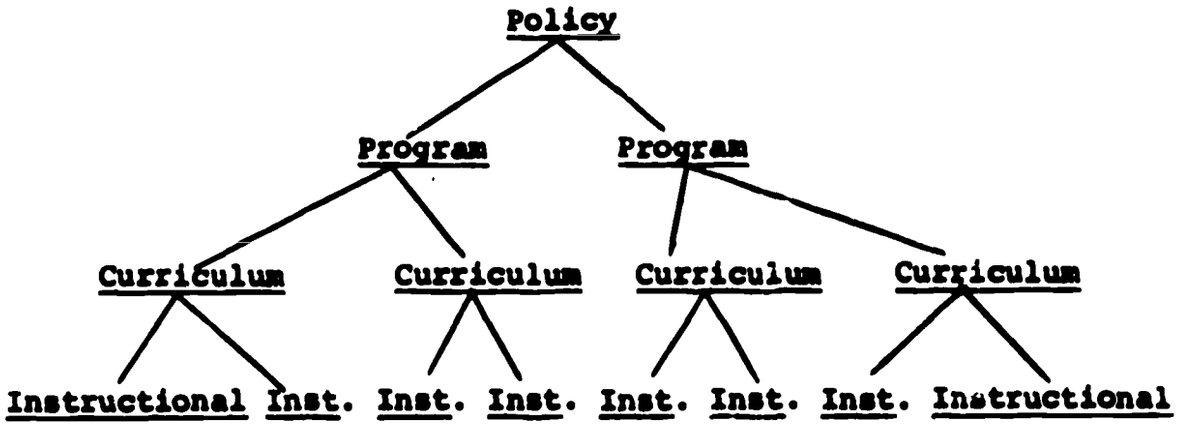

FIGURE 1

Rudiments of Objective Writing

In writing an objective that is to be complete, there are certain elements that need to be understood. (a) What change in behavior is desired? (b) Who or what is to be changed? (c) By what or by whom is the desired change going to be brought about? (d) Where is the process to take place? (e) When and/or how will it be known that the desired change has or has not been accomplished?

The objectives must be written in such a manner as to make it understandable to a person who is not familiar with the work being done and so the procedure can be replicated by other persons or programs. In order to accomplish this goal, an attempt needs to be made to eliminate as much ambiguity as possible while writing objectives.

Let us examine in greater detail these elements.

(a) What change in behavior is desired?

The desired acquisition of a concept, skill development or shift in attitude must be specified. To approach behavior in a somewhat more sophisticated manner, elements of the three domains, cognitive, affective and psychomotor, (as identified and defined by Bloom[1] and Krathwohl[2]) may be used in classifying objectives and specifying change.

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[1]Benjamin D. Bloom et al. Taxonomy of Educational Objectives, Handbook I: Cognitive Domain. New York: David McKay Company, Inc., 1956.

[2]David R. Krathwohl et al. Taxonomy of Educational Objectives, Handbook II: Affective Domain. New York: David McKay Company, Inc., 1956.

(b) Who or What is to be changed?

The idea of writing and using objectives is predicted on the intent or desire to bring about change in a person or thing. In the realm of education, change is sought, most commonly, in people. The people whom we strive to change in some instances, are the students or learners. However, in some cases, it may be the teachers, counselor, janitor, or principal that a program or action is designed to change.

(c) Who or What is designed to bring about the desired change?

If the change in behavior is to be identified as the result of some aspect of the controlled school experience, it is essential that this experience (instructional variable) be specifically identified. What organizational pattern, content offering, method of instruction, type facility of change in any of these instructional vatiables is the most directly related to the objective?

(d) Where is the designated change to take place?

This element refers to "b". Where does "b" occur? Is it at home, in an auditorium, a classroom, study carrells, in the gymnasium? Where does the learner experience the variable which is designated to bring about the specified change?

(e) When and How is it ascertained whether the desired change has occurred?

An employable (usable) method of measuring the quantity and/or quality of change must be spelled out. Included must be the standard of measure (under specified conditions), the acceptable level of performance and limitations in terms of time to bring about the desired change.

CURRICULUM OBJECTIVE

The relevant program objective: _____

_____

Check the pertinent domain of learning: ___Cognitive (thinking skills)
___Affective (attitudes, values)
___Psychomotor (coordination of mind and muscle)

Check the group of students for whom the objective is intended:

____All students at all levels

____Students of a specified group, namely _____

Answer these questions:

1. What skill, concept, or attitude is the student expected to develop through his participation in the experiences and activities provided? _____
_____
_____
_____
_____

2. Under what circumstances, or in what setting, is he expected to develop this skill, concept, or attitude? _____
_____
_____
_____
_____

3. To what extent is the student expected to develop this, or by what criteria will his development be evaluated? _____
_____
_____
_____
_____

Now use your responses to the items above to write the objective:

_____
_____
_____
_____
_____
_____
_____

INSTRUCTIONAL OBJECTIVE

The relevant curriculum objective: _____

_____

Check the pertinent domain of learning: ___Cognitive (thinking skills)
___Affective (attitudes, values)
___Psychomotor (coordination of mind and muscle)

Answer these questions:

1. What is the student expected to do, that is, what performance or product is he expected to exhibit (in order to demonstrate that he has learned whatever he was supposed to have learned)?

_____
_____
_____
_____
_____
_____

2. Under what circumstances, or in what setting, is he to do or exhibit the above? _____

_____
_____
_____
_____

3. To what extent is he to do the above, or by what criteria is his performance to be evaluated? _____

_____
_____
_____
_____
_____
_____

Now use your answers to the above questions to write the objective:

_____
_____
_____
_____
_____
_____
_____
_____
_____

CURRICULUM OBJECTIVES:

INSTRUCTIONAL OBJECTIVES:

(Circle one)

Entry Performance
Enroute Performance
Evaluative Performance

ANSWER THESE QUESTIONS!

1. What are to be the learning outcomes? What will the learner do or produce? _____

2. How well? What level of achievement will he reach? _____

3. Under what circumstances? (What conditions of evaluation will you impose?) _____

Now reword the complete objective.

THE CONCEPT OF CONCEPTS

What is a Concept?

1. A Concept is a theoretical construct; a verbal abstraction. It is cognitive.

   Concept: An idea of something formed by mentally combining all its characteristics or particulars; a construct.

   Construct: To form by putting together parts, build, frame, devise. A complex image or idea formed from a number of simpler images or ideas.

2. Used to raise our level of discourse above "common sense" - to raise our level of understanding about what goes on in the area with which we are dealing.

3. Can be observed in a whole series of behaviors within the phenomenon. Task is to discover those behaviors within the phenomena which best illustrate the behavior.

4. Aids in interpreting a situation. (The better it aids in interpretation, the greater its power.)

5. Is generalizable. Is applicable to a broad range of situations.

6. A concept relates to other concepts.

7. A concept has integration potential.

8. A concept is related and tied to theory.

9. A concept is empirical. It is verifiable.

10. A concept can be used to diagnose a situation.

11. Concepts are not 'self evident'.

12. A concept raises questions about the nature of the enterprise.

13. A concept affects how one views a phenomena.

14. Concepts provide a base for a way to question, a way to observe.

15. Concepts provide a way to discriminate. They raise the level of discrimination, thus increasing efficiency and economy of diagnosis.

16. A concept increases an individual's sensitivity. Enhances a person's awareness.

17. A concept requires both abstractions and generalizations - the first to isolate the property, the second to recognize that it may be ascribed to several objects.

18. Concept - a quality apprehended as common to a class of individual items; e.g. sweetness, durability, excellence.

19. Learnings that permeate thinking.

20. A concept is marked by "consistency of differential, generalized, symbolic response."

21. Concepts involve differentiation: for example, up is not down and a bird is not an airplane.

22. Concepts are generalized because they refer to a class of objects, qualities or relationships. Propulsion, guidance, control and structure are not each individual instances but can encompass a hundred examples in one word.

23. Concepts are symbolic, usually words, although such symbols as the flag, a division sign or a peace symbol may represent concepts.

24. Concepts are not facts.

25. Concepts are not rules, laws or principles. The latter are statements of relationships among many concepts. Air in a low pressure area circulates counterclockwise.

26. Concepts are most useful in cognitive life. They are verbalized and generalized, abstracted and discriminatory.

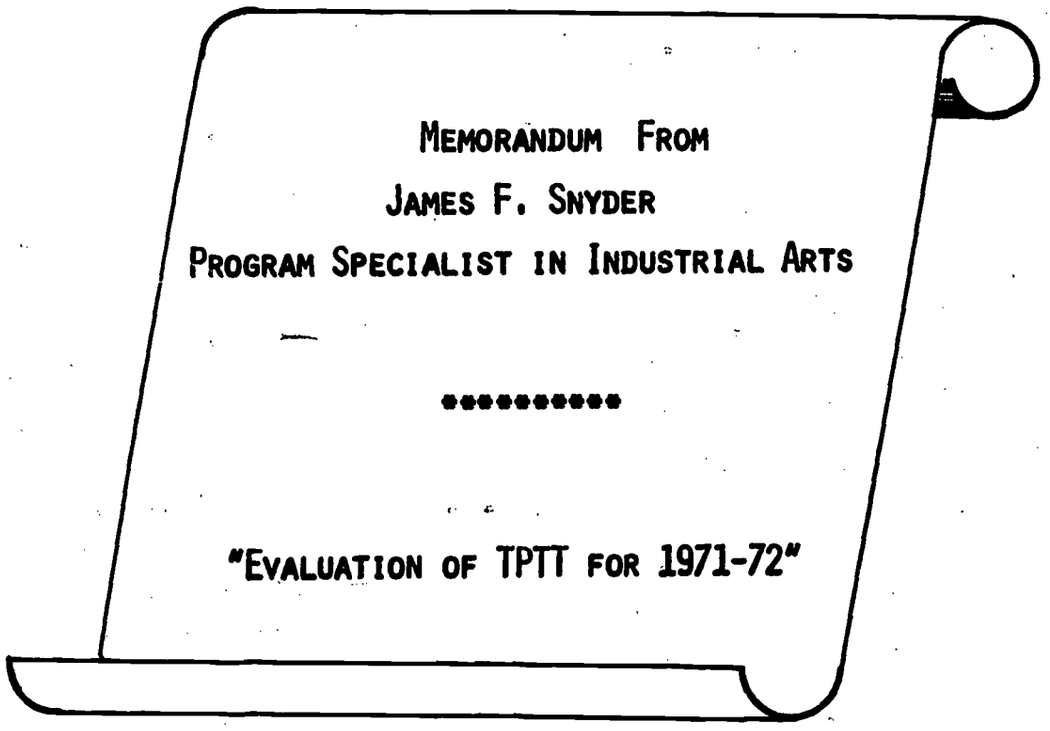
27. Concepts have many advantages.:

    (a) reduce the complexity of the environment,
    (b) provide the means by which the objects of the environment are identified,
    (c) reduces the necessity of relearning at each new encounter,
    (d) they help provide for direction, prediction and planning for each activity, and
    (e) permit ordering and relating classes of objects and events such as species and subspecies or cause and effect.

28. Conceptualizing makes possible retional behavior - exploring, ordering, solving, creating, and predicting.

29. Concepts determine what a person knows and believes and therefore to a great extent what he is.

APPENDIX F


MEMORANDUM FROM
JAMES F. SNYDER
PROGRAM SPECIALIST IN INDUSTRIAL ARTS
"EVALUATION OF TPTT FOR 1971-72"

M-E-M-O-R-A-N-D-U-M

TO: Dr. Paul W. DeVore, Director of TPTT, West Virginia University

FROM: James F. Snyder, Program Specialist, Industrial Arts

SUBJECT: Evaluation of TPTT for 1971-72

DATE: May 22, 1972

Training Program for Teachers in Technologies was a very fruitful and rewarding experience for sixteen teachers of West Virginia. It was the most compact, meaningful non-structured program that could deal with the pertinent issues in Industrial Arts Instruction.

The program was developed around and geared to the question of today's teacher of technologies. The participants identified the priorities for the program and the staff developed and delivered the requested materials. All the proper instructional tools were used to reinforce the presentation through auditory and visual senses. Hands on application offered the participants a tactal association during the program.

The cooperation of Counties, West Virginia University and Industrial Arts Specialist of the State Department of Education provided for a unique and meaningful triangle of combined efforts toward a common identified goal. The improvement of delivery of technological concepts is a need identified by teachers and thus the emphasis was on satisfying that need.

Looking at TPTT from a total point of view to date, it appears all the proper steps have been followed and yet there are other steps to be covered. To date a pilot program of teachers has been conducted with supervisors involved, regional workshops have been conducted to involve all teachers and administrators, a Training of Trainers Program, and field application, have been conducted with all appraches being successful. Still we have some ground to cover. It is necessary to propose regional programs with an emphasis for administrators that would illustrate the evolving philosophies of the

technologies. Administrators need to realize Industrial Arts is not Traditional but Contemporary; that education must be broader in base to provide children with an opportunity to enter a changing society wide-eyed; that all children are not "college bound"; that all children need a technological literacy to compete at any and all levels of societal entry.

Another emphasis would be community awareness of conceptual learning as compared to "project centered" teaching. The parents have been accustomed to the appearance of their child's project in a three dimensional form as compared to conceptual understanding of technology.

Yet a third area of importance would be in-service of college personnel in teacher preparation areas. If change does not occur at this level then a perpetuation of "traditionalism" prevails. Little if any in-service is conducted to up-date college personnel.

Returning to the TPTT project success will be measured in 1.) change made by the teacher in the classroom techniques, 2.) the training of other teachers in the respective geographical areas of the "trainers"-multiplier effect.

JFS:pjo

cc: Dr. Daniel B. Taylor
Dr. Charles W. Southard
Mr. Robert Patterson
Mr. Myron Bender