DOCUMENT RESUME

ED 387 354 SE 056 820

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TITLE PACE '94: Program Evaluation.

INSTITUTION Gary Community School Corp., IN.; Indiana State Commission for Higher Education, Indianapolis.; Indiana Univ. Northwest, Gary.; Merrillville Community School Corp., IN.

SPONS AGENCY Eisennower Program for Mathematics and Science Education (ED), Washington, DC.
PUB DATE 94
NOTE 50p.; For related documents, see SE 056 817-819.
PUB TYPE Reports - Descriptive (141) -- Tests/Evaluation Instruments (160)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS High Schools; *Inservice Education; Mathematics Education; *Program Descriptions; Program Evaluation; Science Education; *Science Programs; *Technology Education; *Tech Prep
IDENTIFIERS *Mathematics Programs; *Tech Prep

ABSTRACT

This booklet describes PACE (Promoting Academic Excellence in Mathematics, Science & Technology for Workers of the 21st Century), an Eisenhower Math and Science Education project, and presents an evaluation of the program. PACE seeks to improve learning opportunities and achievement in mathematics and science for students in target schools (see SE 056 818), with particular emphasis upon mathematics, science, and technology within the Tech Prep programs that are becoming increasingly important around the United States. The vision of the program covers a period of 6 years. The goals are to: develop a 3-week inservice program in mathematics and science education; develop an inservice plan that will ultimately result in the development of course sequences for Indiana tech prep curriculum competencies in mathematics and science; and provide support for staff development. The participants and the summer training program are described and conclusions are drawn. Attitude, confidence, goals, and participant evaluation surveys are included. Appendices include a letter of PACE recruitment, the PACE workshop application form, an evaluation form for summer 1994 workshop, Eisenhower program comments, and ratings of 38 participants. (MKR)

PACE '94

Program Evaluation

Clyde A. Wiles • Kenneth J. Schoon
Editors

PACE

Promoting Academic Excellence In Mathematics, Science & Technology for Workers of the 21st Century.

Gary Community School Corporation
Merrillville Community School Corporation
Indiana University Northwest

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What is PACE?

PACE is an acronym for ***Promoting Academic Excellence in Mathematics, Science & Technology for Workers of the 21st Century.*** This Eisenhower Math and Science Education project is supported by grant funds distributed by the Indiana Commission of Higher Education; it was funded initially for the period of February 1994 through June 1995.

PACE is a multi-year, collaborative consortium including the Gary Community School Corporation, the Merrillville Community Schools Corporation and Indiana University Northwest (IUN). Its overall goal is to offer professional development opportunities to teachers and school corporation staff who are implementing the *Tech Prep* initiatives within the consortium partners high schools. The term "PACE" refers to the entire multi-year plan; "PACE 94" refers to all activities funded by the initial grant, and "Summer PACE 94" refers to the 3-week program conducted at Indiana University Northwest from June 13 through July 1, 1994.

The objectives of PACE are:
1. to promote and strengthen partnerships between teachers of these two "Broadway Corridor" school corporations and the faculty of Indiana University Northwest and,
2. to develop and provide inservice programs in response to the perceived needs of these schools and teachers.

PACE seeks to improve learning opportunities and achievement in mathematics and science for students in the target schools, with particular emphasis upon mathematics, science and technology within the *Tech Prep* programs that are becoming increasingly important in Indiana as well as in the rest of the country.

PACE developed from conversations and meetings involving people from the Gary Community School Corporation, the Merrillville Community School Corporation, and from Indiana University Northwest. The discussions resulted in the formation of a Planning Committee consisting of education and science professors, personnel from the Office of Academic Affairs at IUN, and staff and teachers from the two school corporations. The Planning Committee developed the funded proposal.

The vision for this program covers a period of 6 years. The goals of PACE 94 are:

Goal 1 To develop a three week inservice program in mathematics and science education for teachers and school corporation staff of the "Broadway Corridor" school districts. This initial program will focus on definition and curriculum development for the *Tech Prep* programs of these schools.

Goal 2 To develop an inservice plan that will ultimately result in the development of two, three- or four-course sequences for Indiana *Tech Prep* Curriculum Competencies in mathematics and science. Instructional staff of the "Broadway Corridor" schools will field test and evaluate courses. Evaluation efforts for the developing course series will be multi-faceted; this will include monitoring the results of standardized assessment measures during and after the multi-year project as well as formative and summative assessments of the program involving participants and professional staff.

Goal 3 To provide support for staff development at the target school districts in the area

of *Tech Prep* in mathematics and science, and to provide a model for the concurrent and subsequent development of *Tech Prep* core curricula in content areas other than mathematics or science.

Summer PACE 1994 approached these overall goals through the following subgoals:

1. Awareness and identification of overall *Tech Prep* curriculum - both core and speciality courses - for career clusters that are offered, or are to be offered, in the individual high schools during the coming school years. Core courses in mathematics and science that are to be part of these clusters were of most interest. Faculty must, however, acquire an understanding of the overall *Tech Prep* program as it is currently intended for their respective high schools.

2. Development of mathematics and science courses and units to be taught during the 1994-95 school year, particular attention to be given to the first course of each sequence.

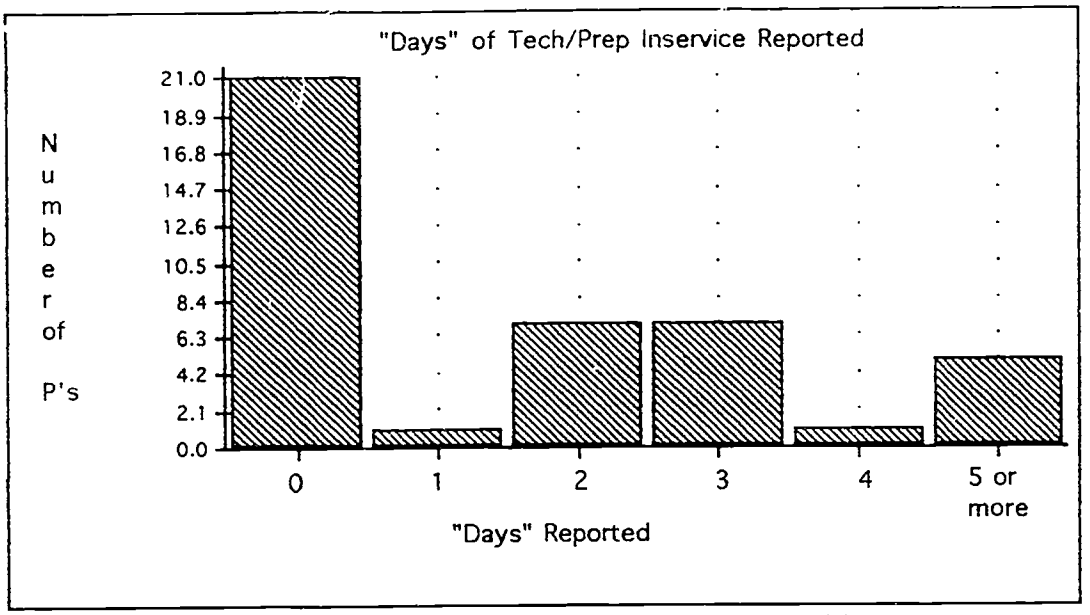
3. Development of multifaceted plans for evaluating specific units and courses, and consideration of how overall *Tech Prep* programs can be evaluated as they are developed.

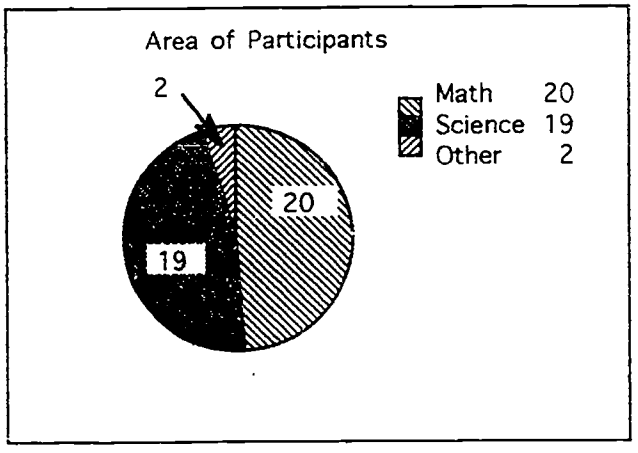
In addition to the 3-week summer program, eight, half-day workshops are planned for the 94-95 school year. Evaluation planning for courses and entire programs are to be part of the academic year workshops.

Participants in Summer PACE 94

Recruitment for participants began with the generation of the initial proposal. Teachers and key administrative personnel brought their concerns to the planning meetings. Our recruitment efforts built upon these. Following the awarding of the grant by the end of February, a letter was sent to all mathematics and science teachers of the consortium high schools; this letter outlined the summer plan and academic year activities that would follow. An application form was distributed with the letters. Teachers were invited to apply for Eisenhower Fellowships. A copy of the letter and application form is found in the appendix. We then conducted awareness meetings with department heads of all the high schools in Gary and key personnel from Merrillville High School. Recruiting was furthered by additional meetings with building principals and other administrative groups, and finally follow-up meetings were held with individual principals at their buildings. The central topic of discussion was the rationale and range of *Tech Prep* programs as they have been proposed and implemented. PACE 94 was presented as a way of addressing faculty needs and school concerns as they move toward *Tech Prep* programming.

There were a total of 41 Eisenhower Fellows in Summer PACE 94. These Fellows were selected from an applicant pool of about 50. The Fellows can be described in many ways. There were twenty (20) mathematics teachers, nineteen (19) science teachers, one (1) supervisor from Gary, and one (1) English teacher who was part of an assigned team at one Gary high school. Twenty six (26) of the participants were women, and fifteen (15) men. Thirty-five (35) of the participants were from Gary high schools, five (5) were from Merrillville High School, and one (1) was a mathematics teacher from Andrean High School - a Catholic high school also in Merrillville. Figure 1 summarizes this data.





School of Participants

School	Number
Andrean	1
Emerson	3
Gary West	5
Horace Mann	8
Lew Wallace	9
Roosevelt	5
Wirt	4
Other Gary	1
Merrillville	5

Figure 1: Participants Summer PACE 1994

The application form asked potential participants to describe their prior orientation to *tech prep* curricula. An analysis was made of these reports by "days" where a "day" is counted as anywhere from 1hour to a working day. Most of the activity reported was in the form of 1 to 2 hour orientation meetings that may have focused upon a specific aspect of proposed *Tech Prep* curricula. While five participants had spent 5 or more "days" considering *Tech Prep* , it is interesting to note that most of the participants, 21 of them, reported no work of any kind directed toward *Tech Prep*.

Table 1 contains a listing of participants (names have been deleted for this report). The table indicates the school and department of each participant. It also summarizes prior experience with *Tech Prep* training programs.

Participants were given the option of registering for 3 hours of workshop credit in Secondary School Curriculum for which they would have to pay the tuition. Eight participants chose to do so.

The 3-week Program

Summer PACE 94 was conducted from June 13 through July 1, 1994. The three week program was organized about 3 themes, corresponding to the goals of the Summer Workshop.

1) Overall curriculum for *Tech Prep* in the high school with particular attention to vocational clusters,

2) Curriculum development focusing on specific courses and units within the course, and

3) Assessment and accountability.

While the basic outline of the activities had been set at the beginning of the Workshop, schedule adjustments were made through-out the three week period to respond to participant needs and interests and to take advantage of resource people who were available to us only after we began.

Our day began at 12:00 noon with coffee and open discussions; structured activities began at 1:00 PM and concluded at 5:00 PM. Fellows also scheduled themselves at other times as needed to complete their work. They reported both their times of attendance and the time of the self-scheduled activity on forms provided for this purpose. The stipends were based upon the hours they were actually present: up to 60 contact hours for scheduled time, and up to 15 hours (an average of 1 hour per day) for reported self-scheduled time. Self-scheduled time took place both on and off campus, in the morning and in the afternoon, and in some cases late evening working time was reported. Participants commonly reported self-scheduled time well beyond the maximum of 15 hours for which they would be paid.

All scheduled activities and most of the self-scheduled time took place at Indiana University Northwest. Rooms were available throughout the day, and one room in particular was devoted entirely to Eisenhower Fellows throughout the summer. This math/science instructional lab contained areas for lectures and discussion, and work areas for small group activity. It was also equipped with two computer systems for participant use and demonstration. This room was available to participants from 8:30 AM through 7:00 PM. The Library and other laboratories of IUN were also used at times.

Participants were assigned to work in groups; the groups for the first week and a half were by school, while the groups for the last week and a half were based upon courses to be

Table 1

PACE Summer 1994 List of Participants

Initials	Experience	Area	School	City
GG	none	Math	Andrean High School	M-Ville
CJ	3 workshops	Math - Consumer Math, Computer Ap	Emerson School	Gary
*MS	3 workshops	Math - Pre Alg, Geom, Pre-calc	Emerson School	Gary
SD	3 workshops	Sci - 8th & Biology	Emerson School	Gary
PB	None reported	Sci/Math	Gary	Gary
JS	2 meetings	Math - Gen Math 1 & 2, Pre Alg, Alg	Gary West Side High School	Gary
RH	None reported	Math - Pre Algebra, Alg 1, Geometry	Gary West Side High School	Gary
JL	2 meetings	Sci - Biol	Gary West Side High School	Gary
*SM	2 meetings	Sci - Gen Sci, Bio 1&2	Gary West Side High School	Gary
JB	None reported	Sci- Biol	Gary West Side High School	Gary
JG	None reported	Math	Horace Mann	Gary
RC	5+ meetings	Math - Gen Math 1, Pre Alg, Alg 1	Horace Mann	Gary
JT	5+ meetings	Math - Gen Math, Algebra	Horace Mann	Gary
WM	5+ meetings	Math - PA, G	Horace Mann	Gary
BH	None reported	Sci - Bio, Bio II, Chem II	Horace Mann	Gary
JW	None reported	Sci - Bio, Gen Science	Horace Mann	Gary
RB	3 + meetings	Sci - Gen Sci, Bio, Chem	Horace Mann	Gary
CW	None reported	Sci- General Science	Horace Mann	Gary
TP	None reported	Math	Lew Wallace High School	Gary
JH	5+ days	Math - Alg 1 & 2, TP Math	Lew Wallace High School	Gary
KM	None reported	Math - Alg 1, Geom	Lew Wallace High School	Gary
*LD	None reported	Math - Gen Math 1&2, Alg 1&2, Math 4, Calc, Basic Math	Lew Wallace High School	Gary
JM	None reported	Math - GM 1, Pre Alg, Alg 1.	Lew Wallace High School	Gary
LC	None reported	Math	Lew Wallace High School	Gary
MC	1 1/2-day tour	Sci - Biol, Chem	Lew Wallace High School	Gary
YH	1 Tech/Prep	Sci - Biol, Pysical Sci, Chem	Lew Wallace High School	Gary
MB	None reported	Sci- Pre Biol, Physics 1	Lew Wallace High School	Gary
*AB	3+ meetings	Math	Merrillville High School	M-Ville
VS	None reported	Math - Alg, Pre Alg, Inf Geom, Alg 2, Analysis, Comp Prog.	Merrillville High School	M-Ville
KC	2 days visitation	Sci - Chem comm (TP), Chem	Merrillville High School	M-Ville
*AR	None reported	Sci - Psy Sci, Bio 1&2	Merrillville High School	M-Ville
DS	3 + meetings	Sci -Chem	Merrillville High School	M-Ville
DA	None reported	English	Roosevelt High School	Gary
RM	None reported	Math - Alg 1 & 2, Pre-Alg, Geom X	Roosevelt High School	Gary
PP	2+ meetings	Math - PA, Gen Math 2, Geom.	Roosevelt High School	Gary
BQ	3+ meetings	Sci - Chem	Roosevelt High School	Gary
CM	None reported	Sci - Physical Sci, Biol	Roosevelt High School	Gary
*JT	3-5 meetings	Math - Alg, Geom, Calc, Computer Programming	Wirt High School	Gary
AC	5+ meetings	Sci - Bio	Wirt High School	Gary
PT	None reported	Sci - Chem, Life Sci	Wirt High School	Gary
MA	None reported	Sci- Gen Sci, Physics	Wirt High School	Gary

* Indicates members of the Oversight Committee for PACE 94/95

taught. Participants shared as members of groups in completing projects related to the theme of the week. These projects have been collected, edited, reproduced and are being distributed to all participants.

The first week's project required participants to work as faculty teams from their individual high schools to describe *Tech Prep* in their high school. This description was to be organized about clusters that are addressed, or that are to be addressed, in their school. It was to include goals, course sequences and course descriptions. The descriptions for the mathematics and science courses are the most detailed. Fellows discovered that the current state of planning in their school ranged from simply designating a few courses or sections as *Tech Prep* courses to extensive plans including complete course listings for many different clusters. In more than one case Fellows took the lead for their school in designating both overall and detailed definition of course sequences. Meetings with principals and guidance counselors were natural parts of the work required to complete this project. These school plans have been collected into one book for distribution.

Participants were assigned during the middle of the second week to working groups based upon specific courses that are to be taught during the 94-95 school year. While these courses are usually the first course in either the mathematics or science sequences, in some cases the course was at a second or third year level. This seemed wise for some teachers who were not going to be teaching the first course in either sequence. Teachers often, however, pooled their insights to assist in the development of a course that they personally were not going to teach, but that would be taught in their building by someone else in the group. These course descriptions and related materials have been compiled for both mathematics and science and are made available in two different books.

The third week of the Workshop was focused upon evaluation. This included both an emphasis upon evaluation and evaluation alternatives within a specific course, and overall evaluation of a cluster program. The first concern was to be specifically addressed in the course descriptions and demonstration units being developed; the second half of this concern will find completion in data collection activities during the coming years. During the third week participants also shared the results of their work with colleagues. Activities were selected from the mathematics and science courses for sharing with the entire group and with principals and other interested school people on Friday of the last week.

Faculty of IUN interacted with Fellows at several points. A variety of lectures, demonstrations and other instructional activities were directed by IUN faculty. Perhaps most importantly faculty interacted with participant groups as they completed their assignments; this provided a continual monitoring of the program as it unfolded. Late afternoons were given to evaluating the day's activity, and morning to planning and setting up the activities for the day at hand.

The PACE workshop Schedule as it was finally experienced is presented in outline form in the following pages.

PACE Workshop Schedule

Week 1: Orientation and Goal Development

Monday, June 13

12:30 Check In / Coffee (Ken) — Conference Center Room D

1:10 Greetings, Introductions and Orientation to the Workshop
Initial Orientation to Goals Development (Clyde)

Cynthia Hicks: *Intro to Tech / Prep*
Familiarize / update participants on Education and T/P in Indiana
Clusters / School-to-Work / Core 40 / Instructional Strategies

3:00 Technology demonstration (John) — G 123 (Reserved 2:30 - 3:55)

4:00 Chancellor's Reception — Conference Center Room D

Tuesday, June 14

12:00 Coffee, discussion / work / conferencing time (Ken) — D329

1:00 Announcements / Focus Group Preferences — D416

Steve Clason: Video of T/P in N Carolina / History of T/P in Indiana
The Mishawaka experience / Specific activities

3:30 Get acquanted activities / Establish working groups (school)

More on the Goals assignment (Drafts due Friday)

4:00 Groups assemble and begin work (D219, D329 and D330 available after 4:00)

Wednesday, June 15

12:00 Coffee, discussion / work / conferencing time — D329

1:00 Announcements / Focus group signup — D416

Barbara Beadle: *A view from the DOE*

4:00 Group work (D219, D329 and D330 available after 4:00)

Thursday, June 16

12:00 Coffee, discussion / work / conferencing time — D329

1:00 Announcements

1:15 Focus group Session 1 (See separate list for "offerings ") — Various locals

3:30 Focus group Session 2 — Various locals

Friday, June 17

12:00 Coffee, discussion / work / conferencing time — D329

1:00 Announcements — D416

1:15 HyperCard session / Group work session — D361, D329

3:15 Group work session / HyperCard session (D219, D361, D329, D330 after 4:00)

Week 2: Curriculum Development

Monday, June 20

12:00 Coffee, discussion / work / conferencing time — D329

1:00 Announcements — D416

Charles McLaughlin, *Organizing for Instruction: Resources for Instructional Units.*

3:30 Thoughts/Comments on group work assignment

4:00 Group work — (D219, D329, D330 available after 4:00)

Tuesday, June 21 (Computer lab open until 5:00)

12:00 Coffee, discussion / work / conferencing time — D329

1:00 Focus Group Session 3 — D361, D329, Various locals

3:30 Arlene Adler, Allied Health

Explanation of Wednesday activity at the River

Orientation to Units writing. Examples of units already done.

Formation of new working groups

4:00 New group work

Wednesday, June 22

12:00 Coffee, discussion / work / conferencing time — D329

1:00 Little Caumet River Activity (SCI) and Critique (with both oral and written feedback)

1:15 Group work (MATH) : Writing units — (D329, D416, D342 available until 4:00)
(D219, D329, D330 available after 4:00)

3:00 Groups switch

Thursday, June 23 (Computer lab open until 5:00)

12:00 Coffee, discussion / work / conferencing time — D329

1:00 Announcements — D416

1:15 Group work: Writing units — (D329, D416, D342 available until 4:00)
(D219, D329, D330 available after 4:00)

Friday, June 24 (Computer lab open all day)

12:00 Coffee, discussion / work / conferencing time — D329

1:00 Announcements — D416

1:15 Group work: Writing units — (D329, D416, D342 available until 4:00)
(D219, D329, D330 available after 4:00)

Week 3: Assessment and Presentations

Monday, June 27

12:00 Coffee, discussion / work / conferencing time — D329

1:00 Announcements — (Note new room) D460

Introduction to assessment: (Clyde)
- Evaluative research
- Student assessment in T/P courses

4:00 Group work (Consider assessment) — D329, D460 (1-4) and D416 (4-6)

Tuesday, June 28

12:00 Coffee, discussion / work / conferencing time — D329

1:00 Math (Golf ball--Clyde) and Science (Critical Thinking--John) activities

2:30 Groups switch

4:00 Group work — D329, D460, and D342 available 1-6

Wednesday, June 29

12:00 Coffee, discussion / work / conferencing time — D329

1:00 Announcements / Split into two groups for the sharing — D460

Group work: Final touches

3:00 Sharing the units (Math and science separately)

Presentations followed by oral and written critiques

Combine some groups for Friday presentations

Thursday, June 30

12:00 Coffee, discussion / work / conferencing time — D329

1:00 Greetings / U.S. Steel presentation --Mike Mako — D460

Group work : Refine units -- Create final product -- Prepare for Friday

Friday, July 1

12:00 Coffee, discussion / work / conferencing time — D329

1:00 Coffee / Refreshments / Greetings — Conference Center A-B

Presentations of instructional materials to principals/counselors/guests

3:30 Program evaluation

Evaluation of Summer PACE 94

Fellows were asked to think about evaluation in terms of "planning for evaluation", the Summer PACE 94 workshop being taken as a laboratory case. Early in the third week groups discussed the program among themselves and prepared initial evaluation responses. These were free form and were used to help construct a more traditional evaluation instrument.

The final instrument consisted of 42 objectively scored, Likert-type evaluation items, and seven open-ended reflective questions. A copy of the Evaluation form is attached to this report. The objective items were clustered about:

Attitude and confidence with respect to Tech/Prep	6 items
The three goals of the workshop	3 items
The logistics and dynamics of the workshop	4 items
The use of time during the structured time	4 items
IUN Faculty, small "focus groups" presentations	12 items
Invited Speakers presentations	7 items
IUN Large Group presentations	6 items

The evaluation form was distributed to all Fellows as part of the final activities of the last Friday. Thirty eight forms were returned. Except for three-choice items, weights or 1,2,3 or 4 - where 4 is the response indicating most satisfaction - were assigned for the items. The first 13 items involved activities that all participants shared in. The total scores for these items were placed in a distribution to determine the general shape of the distribution and to identify any outliers in this ordinal distribution. The maximum possible rating for 13 items is 52. The observed distribution was 25 through 48. The median rating was 43, and the interquartile range was 6. Using the interquartile range as a measure of outliers from the median, it was determined that 3 of the 48 scores might be so classified. The graph that follows (in Figure 2) presents these data. Further analysis was based upon the remaining 35 forms. The entire set of ratings is provided in the Appendix.

Distributions of ratings for the 35 participants are presented in Table 3 "Summary of the Ratings of 35 Participants." The distributions themselves provide the best descriptions of these data. However, for the 4-valued items, if we use medians as the measures of participant satisfaction, we see that 19 of the items had medians of 4, 2 had medians of 3.5, and 16 had medians of 3. All of this indicates at least a basic satisfaction with the workshop alternatives as experienced by the Fellows. There were no medians below 3. The four items that deal with use of time all had medians of 2 indicating general satisfaction with the use of time. for those who may prefer them, means were also computed for each item. As might be expected these mirror the median data in obvious ways.

Summary and Conclusions

A few generalizations seem to be warranted.

1. Teachers judge themselves to be far more confident and enthusiastic about *Tech Prep* at the conclusion of the workshop that they were before. They felt that the projects they had completed had both general value and immediate practical value. They were least sure about the extent to which they would use the curriculum books compiled from the work of all of the groups.

Figure 2

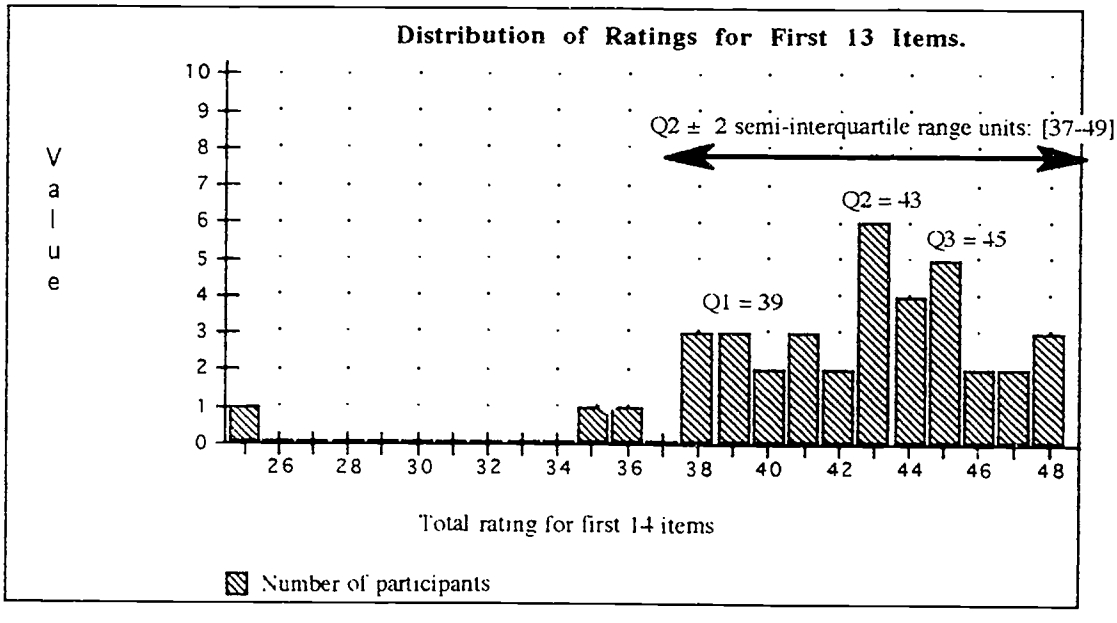

Distribution of Ratings for First 13 Items.
Q2 ± 2 semi-interquartile range units: [37-49]
Q2 = 43
Q3 = 45
Q1 = 39
Value
0
1
2
3
4
5
6
7
8
9
10
26
28
30
32
34
36
38
40
42
44
46
48
Total rating for first 14 items
Number of participants

Table 2

The Sum of the Ratings for First 13 Items.

Data for 38 Participants.

TP	ARE	Sort	S	FRM	A1	B1	C1	D1	E1	F1	A2	B2	C2	A3	B3	C3	D3	A4	B4	C4	D4	A5	A5	B5	B5	C5	C5	D5	D5	E5	E5	F5	F5	G5	G5
1	M	25		G	2	1	3	2	2	1	3	1	1	2	3	4	3	3	2	1	2	1	1	0	0	0	0	0	0	1	4	0	0	0	0
1	M	35		I	1	1	4	3	4	3	3	4	3	4	1	4	4	2	2	3	1	0	0	0	0	1	1	0	0	1	1	0	0	0	0
0	M	36		R	1	3	3	3	4	3	2	3	3	3	4	4	2	2	2	2	3	1	2	0	0	0	0	1	3	0	0	0	0	1	3
0	M	38		S	4	4	3	3	3	3	3	3	B	4	4	4	3	2	2	1	2	1	3	0	0	0	0	1	3	0	0	0	0	0	0
0	SCIE	38		U	3	4	3	3	4	3	3	3	2	4	2	4	3	1	1	2	3	0	0	1	4	0	0	0	0	0	0	0	0	1	4
1	BIOL	38		DD	4	3	4	4	2	4	1	1	3	4	4	4	2	2	2	2	1	0	0	1	3	1	2	0	0	1	4	1	4	0	0
0	CHE	39		W	2	2	4	4	4	4	2	3	3	3	4	4	2	1	1	3	2	0	0	0	0	1	2	0	0	0	0	0	0	1	3
1	CHE	39		X	4	3	4	3	3	3	3	3	3	3	[illegible]	4	3	3	2	2	2	0	0	0	0	1	3	0	0	0	0	1	3	0	0
1	SCIE	39		J J	4	2	3	3	4	3	4	3	4	4	4	1	3	1	1	1	3	1	2	1	2	1	2	1	2	1	3	1	4	1	3
0	M	40		N	3	3	3	3	3	3	4	3	3	4	4	4	4	2	2	2	2	1	3	0	0	0	0	0	0	1	4	0	0	0	0
0	M	40		Q	4	3	4	4	4	3	4	3	4	B	4	3	3	2	2	2	2	1	3	0	0	0	0	0	0	1	4	C	0	0	0
1	M	41		B	4	2	3	3	4	3	4	4	4	4	4	2	3	3	2	1	1	1	3	0	0	0	0	0	0	1	4	0	0	0	0
1	M	41		E	3	3	3	3	3	3	4	4	3	4	4	4	3	1	1	2	2	1	3	1	2	1	4	0	0	1	4	0	0	0	0
0	M	41		P	4	4	3	3	4	3	3	3	2	4	4	4	3	2	2	2	2	1	4	0	0	0	0	1	4	0	0	0	0	0	0
1	M	42		K	3	2	3	4	3	4	4	3	4	4	4	4	3	1	2	2	3	1	3	0	0	0	0	0	0	1	4	0	0	0	0
0	SCIE	42		V	4	3	4	3	3	4	4	4	3	3	3	4	3	2	2	2	2	0	0	1	4	0	0	0	0	0	0	0	0	1	4
0	M	43		D	4	4	3	3	3	4	4	4	3	4	3	4	3	1	1	2	2	1	3	0	0	1	3	0	0	1	4	0	0	0	0
1	M	43		F	4	3	3	4	3	3	4	4	3	4	4	4	3	2	1	1	2	1	3	0	0	0	0	0	0	0	1	3	0	0	0
0	ALG	43		O	4	3	3	3	4	3	4	4	4	4	4	3	3	3	2	1	1	1	3	0	0	0	0	0	0	1	4	0	0	0	0
0	SCIE	43		Z	4	3	3	4	3	3	4	4	4	4	3	4	3	2	3	2	2	0	0	1	4	1	4	0	0	1	4	0	0	0	0
1	CHE	43		EE	3	4	4	4	4	3	3	3	4	4	3	4	4	1	2	2	2	C	0	1	4	0	0	0	0	0	0	1	4	0	0
1	BIO/	43		FF	4	4	3	4	4	4	3	3	3	4	3	4	3	B	2	2	1	0	0	1	4	0	0	0	0	0	0	0	0	0	0
0	M/S	44		*	4	4	4	3	3	4	4	3	3	4	4	4	3	2	2	2	2	0	0	1	4	0	0	0	0	1	3	1	4	1	4
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0	ENG	45		A	4	4	4	4	4	3	3	4	3	4	4	4	4	2	2	2	2	1	3	0	0	0	0	0	0	1	4	0	0	0	0
1	M	45		J	4	4	4	4	4	3	3	3	4	4	4	4	4	2	2	2	2	1	4	0	0	0	0	1	4	0	0	0	0	0	0
0	[redacted]	45		T	[redacted]	4	[redacted]	3	[redacted]	[redacted]	3	[redacted]	4	[redacted]	[redacted]	4	[redacted]	2	[redacted]	2	[redacted]	2	[redacted]	3	[redacted]	0	[redacted]	0	[redacted]	0	[redacted]	0	[redacted]	0	[redacted]	0	[redacted]

13

17

18

TP	ARE	SortS	FRM	A1	B1	C1	D1	E1	F1	A2	B2	C2	A3	B3	C3	D3	A4	B4	C4	D4	A5	A5	B5	B5	C5	C5	D5	D5	E5	E5	F5	F5	G5	G5
1	BIOL	45	GG	4	4	4	4	5	3	4	3	3	3	4	4	3	2	2	2	2	0	0	0	0	1	4	0	0	0	0	0	0	0	0
0		45	KK	4	3	4	4	3	3	4	4	4	4	4	4	3	B	2	3	1	0	0	1	4	0	0	0	0	1	4	0	0	0	0
0	PHY	46	Y	4	4	4	4	4	4	3	4	3	4	4	4	3	2	2	1	2	1	3	1	2	1	2	1	4	1	2	0	0	0	0
1	SCIE	46	BB	4	4	4	3	4	4	4	4	3	4	4	4	4	1	1	3	2	0	0	1	4	0	0	0	0	1	4	0	0	0	0
1	SCIE	47	HH	4	4	4	4	4	4	4	4	3	4	4	4	4	2	2	2	2	0	0	1	4	0	0	0	0	0	0	0	0	0	0
1	CHE	47	II	4	4	4	4	4	4	4	4	3	4	4	4	4	2	2	2	2	0	0	0	0	1	4	0	0	1	4	0	0	0	0
1	M	48	H	4	4	4	4	4	4	4	4	4	4	4	4	3	2	1	B	B	0	0	0	0	1	4	0	0	1	4	1	4	0	0
0	M	48	M	4	4	4	4	4	4	4	4	4	4	4	4	3	2	1	2	2	1	4	0	0	0	0	1	4	1	2	1	4	0	0
1	BIOL	48	CC	4	4	4	4	4	4	4	4	4	4	4	4	3	2	2	2	2	0	0	0	0	1	4	0	0	0	0	1	4	0	0

Table 3

Summary of the Ratings of 35 Participants.

Evaluation of Summer Workshop PACE 94: Participant Ratings

Attitude and confidence vis-a-vis tech/prep

My understanding of tech/prep is now:

a) much improved. b) some improved.
c) a little improved. d) unchanged.

[*Mean 3.77 distribution 28 6 1 0]

My confidence and enthusiasm for teaching tech/prep is now:

a) much improved. b) some improved.
c) a little improved. d) unchanged.

[Mean 3.43 distribution 19 12 4 0]

To what extent has this workshop provided you with teaching ideas within or outside of tech/prep?

a) a great deal. b) some. c) a little. d) not at all.

[Mean 3.60 distribution 21 14 0 0]

How pleased are you with your *first project*?

a) a great deal. b) some. c) a little. d) not at all.

[Mean 3.54 distribution 19 16 0 0]

How pleased are you with your *second project*?

a) a great deal. b) some. c) a little. d) not at all.

[Mean 3.60 distribution 22 12 1 0]

To what extent do you expect to use the *PACE 94 Summer Projects* booklet?

a) a great deal. b) some. c) a little. d) not at all.

[Mean 3.43 distribution 15 20 0 0]

NOTES:

1 Means are computed using weights of: a) =4; b) =3, c) = 2; d) = 1.

2 Forms were received from 38 of the 41 participants; an analysis of distributions led to the exclusion of the data from three "outliers". The data reported do not include the data from the outliers. Not all participants responded to every item so the total may not always be 35.

3 The raw data set for all 38 participants is presented in the appendix.

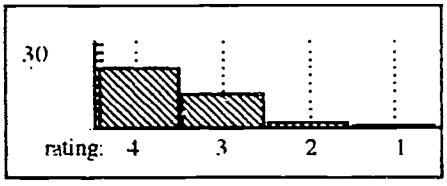
Evaluation of Summer Workshop PACE 94: Participant Ratings

To what extent do you believe we reached the following goals of the workshop?

i) Enhanced awareness of Tech/prep programs in your school.

a) a great deal. b) some. c) a little. d) not at all.

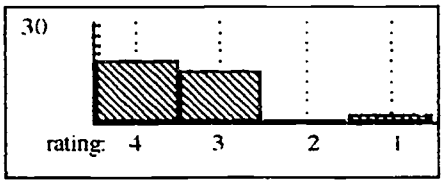
[Mean 3.57 distribution 23 10 1 1]



ii) Identification of specific instructional units and plans for 94-95.

a) a great deal. b) some. c) a little. d) not at all.

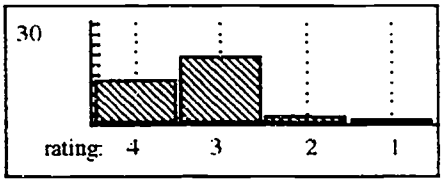
[Mean 3.49 distribution 19 15 0 1]



iii) Planning for evaluation and development of T/P in your school.

a) a great deal. b) some. c) a little. d) not at all.

[Mean 3.35 distribution 14 18 2 0]



Dynamics of the workshop

How valuable to you was the opportunity to work with other teachers *from your building* (such as for the first project?)

a) a great deal. b) some. c) a little. d) not at all.

[Mean 3.88 distribution 30 4 0 0]

How valuable to you was the opportunity to work with other teachers *in your discipline* (such as for the second project?)

a) a great deal. b) some. c) a little. d) not at all.

[Mean 3.77 distribution 28 6 1 0]

Did you like the use of self-scheduled time?

a) a great deal. b) some. c) a little. d) not at all.

[Mean 3.80 distribution 31 2 1 1]

How important was the stipend to your participation this summer?

a) a great deal. b) some. c) a little. d) not at all.

[Mean 3.20 distribution 10 22 3 0]

Evaluation of Summer Workshop PACE 94: Participant Ratings

The workshop was organized about 4 major components; rate the appropriateness of the *time* given to each.

Please rate the following components:	Means, weights	TIME: 1 too much	2 OK	3 too little
1. The school writing project,	1.82	9	21	3
2. The course & Unit writing project,	1.80	9	24	2
3. Invited presentations,	1.94	6	24	4
4. IUN faculty presentations and demonstrations.	1.88	7	24	3

focus groups

Usefulness & Value

	mean score	very much	important to me	little	none
Pythagoras, Geoboards etc.	**3.11**	3 3 0 0	14 12 1 1	1 0 1 0	0 0 0 0
Micro Biology & Contagions	**3.46**	9 0 7 2	1 0 1 0	3 1 2 0	0 0 0 0
Computer Simulations (O'Dell Lake)	**3.23**	7 2 5 0	2 1 1 0	4 0 4 0	0 0 0 0
Circles & Other Round Things	**3.38**	4 3 1 0	3 3 0 0	1 0 1 0	0 0 0 0
Introduction to Word Processing	**3.63**	14 8 4 2	3 0 2 1	2 1 1 0	0 0 0 0
Teaching Strategies (Learning cycle)	**3.73**	8 3 4 1	3 1 2 0	0 0 0 0	0 0 0 0
Mapping & Critical Thinking	**3.50**	3 0 2 1	3 0 3 0	0 0 0 0	0 0 0 0
Math: Mailing Packages	**2.85**	4 2 1 1	4 3 0 1	4 2 2 0	1 0 1 0
Introduction to SSG and BP	**3.33**	7 7 0 0	3 1 2 0	1 1 0 0	1 0 1 0
Altering Sci. Models (evolution)	**3.40**	2 0 2 0	3 0 2 1	0 0 0 0	0 0 0 0
Using Internet	**3.87**	6 3 3 0	5 1 3 1	3 2 1 0	1 0 1 0
Bioethical Decision Making	**3.88**	7 1 5 1	1 0 1 0	0 0 0 0	0 0 0 0

Key to participant ratings

Means computed using weights of:

"very much" = 4; "important to me" = 3, "little" = 2; "none" = 1

Within boxes:

total participants		
math	science	"other"

Evaluation of Summer Workshop PACE 94: Participant Ratings

Invited speakers

	mean score	very much	important to me	little	none
Cynthia Hicks, Former T/P coordinator	3.89	11 4 7 0	16 8 6 2	8 4 3 1	0 0 0 0
Steve Clason, T/P Mishawaka Coord	3.69	24 11 10 3	11 5 6 0	0 0 0 0	0 0 0 0
Barbara Beadle, BOE	3.15	12 3 8 1	15 9 4 2	5 2 3 0	1 1 0 0
Charles McLaughlin, BSU	2.74	7 1 6 0	13 6 5 2	12 7 4 1	2 2 0 0
Arlene Adler, Allied Health, IUN	3.26	14 5 8 1	15 7 6 2	5 4 1 0	0 0 0 0
Mike Certa, Data Processing, IUN	3.16	9 4 5 0	19 9 7 3	4 2 2 0	0 0 0 0
Mike Make, USX	3.56	20 10 8 2	13 5 7 1	1 1 0 0	0 0 0 0

Large Group presentations by IUN PACE Faculty

	mean score	very much	important to me	little	none
Technology Demo - John Bustman	3.29	15 3 12 0	10 5 2 3	6 6 0 0	0 0 0 0
Little Calumet Field Trip - R. Watau	3.24	16 5 10 1	12 5 5 2	4 3 1 0	2 2 0 0
Golf Ball Activity - C. Wiles	3.07	12 5 7 0	8 4 2 2	10 5 5 0	0 0 0 0
Genetics & Critical Thinking - J. Bustman	3.35	14 4 10 0	7 5 1 1	5 3 2 0	0 0 0 0
Evaluation alternatives - C. Wiles	3.40	15 5 8 2	12 8 3 1	3 0 3 0	0 0 0 0
Hyper-card introduction - J. Galloway	3.12	10 7 3 0	10 3 5 2	5 2 2 1	1 1 0 0

2. With respect to the goals for Summer PACE 1994, they again expressed considerable satisfaction with both their enhanced awareness of *Tech Prep* and with the curriculum work they had done. While they were generally pleased with evaluation and development plans for their school, they expressed the least satisfaction here. Teachers are well aware that they do not control all of the variables critical to curriculum implementation.

3. Teachers were very enthusiastic about the opportunity to work other teachers , both within and outside of their building, and they particularly appreciated the self-scheduled time, though there was some concern present. This is seen specifically in the free-form comments about the accuracy of the self-reported times. Interestingly, the opportunity to work with colleagues was more valued than was the stipend. However, the ratings still indicated that actual participation might have been critically related to the availability of a stipend.

4. Though more respondents indicated too much time was given to various activities than too little, the ratings indicate an overall satisfaction with the time given to all components of the workshop.

5. The "focus groups" were small group activities provided by IUN faculty that focused upon some particular aspect of content and/or approach to instruction. There was some choice on the part of participants as where to go for these sessions, however, they were required to go somewhere. The numbers of participants in a specific group therefore may have been few, and may in some cases have been forced by the fact that there were never more than 4 choices at any one time. There was some dis-satisfaction expressed here, but much more satisfaction.

6. The invited speakers were very well received. These persons were selected because of their particular perspectives on some aspect of *Tech Prep* programs. The viewpoints and resources provided by Mr. Clason, Coordinator of the demonstration site program at Mishawaka, and Mr. Mako, Department Manager of Employee Services of U S Steel were particularly valued.

7. The large group presentations by IUN faculty were required of all participants in some way. Sometimes this was as part of a homogeneous group where the presentation was repeated, and at other time as a total group. Again there was a general satisfaction, though not total, with these activities.

Some effort was made to assess differences in viewpoints between the mathematics teachers and the science teachers. The pages "Summary Ratings of the 35 Participants" reflect this in that responses for science teachers, mathematics teachers, and "others" {the English teacher, the math/science coordinator, and a participant who did not indicate area} are broken out for each item starting with the focus groups items. Differences are sufficiently small and the respondents too few to allow meaningful interpretations.

Next Steps

This report is preliminary but sufficient to provide the Oversight Committee and Director with insight into planning for the Fall meetings and to guide in the preparation of the proposal for PACE 95. As is noted elsewhere, this report is one of a series of reports providing a record of summer activities, an evaluation of the 1994 PACE workshops and copies of the participants' work.

APPENDICES

PACE Promoting **A**cademic **E**xcellence in Mathematics, Science & Technology for Workers of the 21st Century.

Indiana University Northwest
Gary Community Schools
Merrillville Community Schools

Indiana University Northwest
3400Broadway
Gary, IN 46408

Dear Mathematics & Science Teachers,

Indiana University Northwest and the School Districts of Gary and Merrillville have joined forces to develop courses for the Tech-Prep curriculum.

"Tech Prep" is intended to provide a meaningful curriculum for those students who do not plan on going to college after high school. Many of these students need a more practical orientation - a "hands on" approach - to their studies. Tech-Prep programs are intended to address the needs of more than half of our students in ways that will enable them to more successfully encounter the world of work, or begin training in vocational programs.

Although practical in nature, Tech-Prep courses must also be rigorous enough to allow students who change career goals to be admitted to a college or university after graduation.

In Indiana the Tech-Prep program, at least for students who intend to pursue 2 or 4 year college programs, will include the following:

- 4 years of Language Arts (literature, composition, speech)
- 3 years of Science (Biology, Chemistry, Physics, Earth/Space Science)
- 3 to 4 years of Mathematics (starting with Algebra - First Course)
- 3 years of Social Studies.

We need to identify Eisenhower Fellows from high schools in Gary and from Merrillville High School who wish to be involved with the development of three-year sequences of mathematics and science courses for the Tech Prep programs in their school. These fellows will attend a three-week summer workshop at IUN from June 13 through July 1, 1994. These are scheduled in the afternoons to avoid Summer School assignments.

There are stipends of $60 per day for the 15 days for 20 Mathematics Fellows and 20 Science Fellows who will be selected from the staffs of these high schools. Fellows are expected to share in the follow-up activities during the coming school year which include release time during the week to enable Fellows to confer and share with each other.

If you are interested in being part of this effort, we ask you to complete the accompanying application form and return it to Indiana University Northwest as soon as possible. We will consider applications by the end of April and continue until the 20 math and 20 science slots are filled.

Please consider how you might be a part of this initiative. If you have any questions, or want further information call Ken Schoon at 980-7766 or Clyde Wiles at 980-6519. We hope to hear from you soon.

Very truly yours,

Clyde Wiles, Project Director

Ken Schoon, Assistant Director

PACE Workshop for 1994-1995

June 13 - July 1

Application Form

Name _____

School _____

School address _____

_____

School phone _____

Home address _____

_____

Home phone _____

Subjects taught _____

_____

Please list all Tech/Prep workshops or seminars you have attended:

Workshop	Place	Date

Please enroll me in the PACE Workshop for 1994-1995. In addition to the three-week summer workhop. I will be available to meet monthly during the 1994-95 school year.

_____

Signature

_____

Date

Evaluation Form for Summer 1994 Workshop

Your content area _____ Scheduled to teach T/P this year? _____

Attitude and confidence vis-a-vis tech/prep

Please circle the response that best describes your feelings.
Comment on the other side as you wish. Thanks!

My understanding of tech/prep is now:
a) much improved. b) some improved.
c) a little improved. d) unchanged.

My confidence and enthusiasm for teaching tech/prep is now:
a) much improved. b) some improved.
c) a little improved. d) unchanged.

To what extent has this workshop provided you with teaching ideas within or outside of tech/prep?
a) a great deal. b) some. c) a little. d) not at all.

How pleased are you with your *first project*?
a) a great deal. b) some. c) a little. d) not at all.

How pleased are you with your *second project*?
a) a great deal. b) some. c) a little. d) not at all.

To what extent do you expect to use the *PACE 94 Summer Projects* booklet?
a) a great deal. b) some. c) a little. d) not at all.

To what extent do you believe we reached the following goals of the workshop?

i) Enhanced awareness of Tech/prep programs in your school.
a) a great deal. b) some. c) a little. d) not at all.

ii) Identification of specific instructional units and plans for 94-95.
a) a great deal. b) some. c) a little. d) not at all.

iii) Planning for evaluation and development of T/P in your school.
a) a great deal. b) some. c) a little. d) not at all.

Dynamics of the workshop

How valuable to you was the opportunity to work with other teachers *from your building* (such as for the first project?)
a) a great deal. b) some. c) a little. d) not at all.

How valuable to you was the opportunity to work with other teachers *in your discipline* (such as for the second project?)
a) a great deal. b) some. c) a little. d) not at all.

Did you like the use of self-scheduled time?
a) a great deal. b) some. c) a little. d) not at all.

How important was the stipend to your participation this summer?
a) a great deal. b) some. c) a little. d) not at all.

The workshop was organized about 4 major components; rate the appropriateness of the ***time*** given to each.

Please rate the following components:

	TIME: too much	OK	too little
1. The school writing project,			
2. The course & Unit writing project,			
3. Invited presentations,			
4. IUN faculty presentations and demonstrations.			

focus groups

	Usefulness & Value: not present	very much	important to me	little	none
Pythagorus, Geoboards etc.					
Micro Biology & Contagions					
Computer Simulations (O'Dell Lake)					
Circles & Other Round Things					
Introduction to Word Processing					
Teaching Strategies (Learning cycle)					
Mapping & Critical Thinking					
Math: mailing packages					
Introduction to SS and DB					
Altering Sci. Models (evolution)					
Using Internet					
Bioethical Decision Making					

Invited speakers

	Usefulness & Value: not present	very much	important to me	little	none
Cyndi Hicks, Former T/P coordinator					
Steve Clasen, T/P Mishawaka Coord					
Barbara Headle, Indiana DOE					
Charles McLaughlin, BSU					
Arlene Adler, Allied Health, IUN					
Mike Certa, Data Processing, IUN					
Mike Make, BSU					

Large Group presentations by IUN Faculty

	Usefulness & Value				
	not present	very much	important to me	little	none
Technology Demo - John Bustman					
Little Cal Field Trip - R. Betaw					
Golf Ball Activity - C. Wiles					
Genetics/Critical Thinking - J. Bustman					
Evaluation alternatives - C. Wiles					

Hyper-card Intro - J. Galloway

Reflective questions:

What were the "six best" things about this three week workshop?

What do we need to accomplish during our monthly meetings during the school year?

What should we consider for next summer?

continue:

delete:

expand on:

initiate:

If funding is approved for a follow-up workshop next summer, how likely is it that you would want to attend?

Last week, a Northwest Indiana teacher (not from Gary or Merrillville) was overheard to say that "Tech/Prep is another stupid idea pushed on the schools by the out-of-touch Indiana Legislature. What are your thoughts about such a comment?

How would you describe your present enthusiasm for tech/prep? Why?

Other (Use the other side)

Eisenhower Comments 94

Eisenhower Comments 94

REFLECTIVE QUESTIONS:

What were the "six best" things about this three week workshop?

* 1. Introduction to Tech Prep ideas.
2. Opportunity to generate spreadsheets for two projects.
3. Opportunity to see the development of Tech Prep locally and possible expectations.
4. The development of various units and determination of extent of change in teaching styles.
5. The chance to see teachers actually combining their talents to achieve an objective - THE LESSONS.
6. To get a chance to see first hand the extent of understanding by teachers of the various lessons they are preparing to teach.

A 1. Teamwork
2. Relaxing atmosphere.
3. Cooperation of fellow teachers and directors of project.
4. Integration of different disciplines and ideas.
5 Development of units and clusters.
6. Sharing of ideas.

AA 1. Self Scheduled time.
2. Presentations given by IUN personnel.
3. Invited speakers.
4. Availability of the computers.
5. Wit and delivery of Dr. Wiles.

B 1. Development of course units.
2.Technoloy demo.
3. Evaluation alternatives.
4. Steve Clason's presentation.
5. USX Presentation.
6. Cooperative learning activities.

BB 1. Loved the science presentations.
2. Working with teachers from other schools.
3. Learned a great deal about constructing curriculum
4. The opportunity of acquiring useful materials that I can use immediately.

C Working with the IUN faculty, meeting other science and math teachers, time of workshop, variety of activities, presentations by invited speakers, and flexibility of self-scheduled time.

CC 1. Working together with teachers from other schools.
2.Brainstorming and coming up with new ideas.
3 Working together with teachers in your own area.
4. The actual hands-on and personal involvement activities.
5. The presentations.
6. The basic format of the entire workshop.

D 1. My understanding of what Tech-Prep is increased.
2. I was able to interest and fellowship with fellow educators.
3. I came to appreciate the workshop of the computer more.
4. I've gained new approaches to teaching.
5. I've learned the importance of integrating the subject areas.

DD 1. New information.
2. New activities and labs.
3. Group presentations.
4 Individual study.
5 Demonstrations
6 The food

E
1. Interaction with stuff members at the same and different schools
2. Speakers for industry.
3. Articulation between IUN and High Schools in NW IN
4. Ideas/concepts to focus on in TP
5. Subject integration.

F
1. Little Calumet field trip.
2. Biology - contagions.
3. Working with the instructors, especially Ken. I'm glad I know the 4 of you and hopefully I'll be able to use all of you as resources.
4. Completing the two projects - they'll be useful.
5. Mike Mako presentation.
6. Meeting other teachers - we can hopefully work together.

1. Sharing with teachers in my system.
2. Getting overall pictures of where our school is.
3. Individual time to work.
4. Many different speakers to demonstrate viewpoints.
5. Getting opportunities to bounce ideas off of colleagues.
6. Flexibility and understanding nature of presenters (IUN Professors).

I
1. Hands-on experience.
2. Working with teachers of common group (disciplines)
3. Working with teacher from our school.

G
1. It was a new approach in teaching.
2. The students should be better equipped to get a good job without a college degree.
3. Only students who have a gpa of 'C' or better should be in T.P.
4. I learned new things about the computer.
5. We need to have computers for each student.
6. As teachers, we have to be more creative with hands on teaching.

1. Discussion on how curriculum in school must change.
2. Rationale for how and why curriculum will change.
3. Models produced that can be used.
4. Current issues about what is expected of students.
5. Development of units to be used.
6. Sharing of developed units.

H
1. The opportunity to work with other teachers.
2. The chance to develop models and plans
3. The ideas given by some presenters.
4. The opportunity to work on the Macintosh.
5. The coffee and doughnuts.
6. The chance to understand and evaluate my school's present status and the needed course of direction.

I worked with other teachers from my school. I worked with science teachers at other schools. I learned how to work my computer Dr. Wiles showed me how to merge computer data. I worked with a scanning unit that converted imagetext. I loved the idea of working with computers in the class.

1. Working with fellow teachers to develop a product.
2. The lack of pressure on us - no stress.
3. Working with the hands on activities.
4. Sharing of ideas.

1. Integration with teachers from my school and other schools.
2. Getting started with course work.
3. Developing course work for this year's Tech Prep.
4. See other views and ------ teachers are doing.
5. Money

K
1. Working and fellowship with other teachers
2. Learning more about Tech Prep.
3. Receiving information packages from other Tech Prep sites.
4. Learning some concepts about the Macintosh.
5. The products produced.

KK
1. Interaction among teachers.
2. Knowing that there is now always the right answer.
3. Some of the faculty presentations.
4. A better understanding of Tech Prep.
5. The teachers are willing to work and have some uniformity in curriculum - city wide

L
1. Learned how use spreadsheet.
2. Learned to think clearly and specifically about goals before doing lesson plans.
3. Learned to be more of a team player.
4. Saw the applicability of math and science to real world.
5. Had fantastic well read, intelligent facilitator, especially Dr. Wiles and Dr. Schoon
6. Learned hypercard.

M
1. New laws concerning education requirements and changes there of.
2. Golf ball activity.
3. Circle and round things.
4. Interaction with co-workers and members of other staff.
5. Curriculum planning.
6. Idea discussed about alternative assessment.

N
1. Working as a group (school).
2. Getting ideas from other schools.
3. Working as a department.
4. Being able to involve other disciplines.
5. Getting some of your problems solved by others immediately.

O
1. Cooperative learning with other teachers.
2. Clarification of the need to teach material in a relevant setting.
3. Exposure to individuals from higher educational institutions and industry.

P
1. Working without having to worry about students and teaching (in the summer).
2. Working with other teachers in the Gary area
3. Planning overall programs.
4. Listening to experts.
5. Working on math units.

Q
Working with other math teachers developing units. Learning different methods of assessment. Learning about the 'neglected majority' and need for Tech Prep. Hearing the USX point of view. Meeting other teachers. Getting new book free.

S
1. Working with other teachers in our system.
2. Working with other teachers in my field.
3. Working with other teachers from my school.
4. The information gathered.
5. The networking - meeting the chancellor.
6. The time on task without children.

T
Working with teachers from other disciplines. Developing USABLE plans for the next school year. Hearing from qualified people in different areas. Having enthusiasm for teaching boosted. Having mind expanding ideas shared. The time was right-not too long- not too short.

U
1. Working with math teachers.
2. Tech Prep general information.
3. Developing Tech Prep curricula.
4. Developing units/activities.
5. Altering present activities to more hands on.
6. Realization of other teachers as resources.

V
1. Chance to interact with other teachers.
2. Learning new activities to use in the classroom
3. Meeting teachers from other schools in my field.
4. Enhance my computer skills.
5. Finding what students need to learn from people in different fields.
6. I enjoyed working with IU professors.

W
1. Working with other staff members in my district.
2. Working with staff from my school.
3. Discussion of the Core 40 and how it relates to Tech Prep.
4. The workshop forced us to talk to our administer.
5. Discussion of alternatives to evaluation.
6. The employment director at USX.

X
1. Listening to Dr. Wiles' learning styles and the TP approach.
2. Getting the time to do the processing - letting this new approach "rattle around" my head.
3. Taking a unit and thinking it through - concepts to execution.
4. Getting a chance to talk with colleagues about TP.
5. Having an opportunity to bounce thoughts off the experts.
6. Hearing employment people talk about TP.

Y
1. Understanding TP.
2. Opportunity to work with other teachers and schools.

Z
1. The opportunity to work with my team from school.
2. The comradery of the groups.
3. The information shared by speakers.
4. The units and suggestions of courses that had already been developed (a good start).
5. The time to work but not a feeling of being pressured.
6. Enough work.

What do we need to accomplish during our monthly meetings during the school year?

1. Feedback on actual lessons.
2. Development of new ideas to keep courses interesting to students and some evidence of this.
3. A report on grades given students in the various classes.
4. More opportunities to interface with business and industry personnel on learning needs of employees.

A
1. Make progress checks on how things are going.
2. Keep Tech/Prep people enthused by sharing positive things - as the year progresses, snags will occur We must overcome and prosper from these snags.

B
1. How TP curriculum is different from academic track.
2. Development of ALL goals and objectives for each TP course.
3. Proficiencies need to be developed for each TP course.

BB
1. Continuous feedback on the progress or lack of progress with the TP program.
2. What works and what doesn't.
3. Exchange updated information.

C
Support as efforts are made to implement tech prep; current information regarding issues relative to tech prep; sharing and discussing concerns of tech prep.

CC
1. Feedback on what works and does not.
2.Brainstorming sessions and sharing of new ideas, success stories
3. Be informed about updated and new materials, supplies, etc.
4. Create a resource booklet from the group, i.e , speakers used, field trip info, materials that work better than others, technique that improves lesson plans.

D
We need to interact with one another to see how well things are going. See if any help is needed in any of the clusters Recommend speakers if needed

DD
I feel that we should present progress reports for those teachers who actually are Tech-Prep teachers

I: How to continue to develop clusters? Concentrations - Integrated TP curriculum (Team teaching - TP)

HE: 1. Formulate a plan for us to continue
2. Follow up surveys

F: How to keep updated on how everyone is doing plus design next summer to improve.

FF: 1. Listen to success stories.
2. Give assistance to teachers in need.
3. Introduce hands-on experiences

GG: We need to have more information on how to have more hands-on the subjects that we are teaching

H: Sharing of units that are produced--like what was turned in for project 2 but on an integration of disciplines

HH: N.A

II: 1. Stress to counselors no to use Tech Prep as a dumping ground for the lower students.
2. Work with getting partners of industry per school.
3. Work on additional funding for spacial equipment.

J: Follow-up - check on the teachers involved.

JJ: How things are going and what can be done to help iron out problems that might occur.

K: Brainstorming sessions should be held to discuss problems in teaching activities or curriculum units planned to be taught.

KK: Uniformity and ways of sharing ideas and curriculum.

L: 1. What sort of evaluation criteria is been used.
2. Planning a reunion of teachers who are doing Tech Prep.
3. Having a resource person/people one can talk to when problems arise.

M: Further discussion on evaluation techniques/how successful were the ones given out this summer.

N: Share what we have done, what works and what doesn't work

O: 1. Monitor results of the first year efforts
2. Exchange of ideas.

P: Logistics of getting programs in schools. Ways to get students in program. Evaluate teaching styles. Put spark back into teachers

Q: Share experiences.

S: A continued effort to strive for Tech Prep unities and expansion.

T: Who in the school systems need to attend, that have not yet attended? Everyone needs to be aware of it. Constant updates on any legislative changes. How year around reinforcement can be made available for teachers - avoid 'slumps' or 'backsliding'

U: More activity ideas! Encouragement - help us to not get discouraged. Exchange of ideas.

V: 1. More activities and demonstrations that can be used in the classroom.
2. Speakers from different fields.

W: 1. Whether materials were used and the effectiveness
2. Things to be shared with other schools.
3. Topics for next year.

X: Have a sounding board for discussion of problems to come up

Y: 1. How TP is going in our classrooms.
2. Evaluate the development of our projects and planning.

1. A follow-up to determine if the schools are using the Tech Prep information.
2. If there are problems that can be discussed and possibly be solved.
3. To offer suggestions for further implementation.

What should we consider for next summer?

continue:

Develop lessons for second year of program. Increase industrial-business interface (banks, accountants, mfg.).
Curriculum units writing.
Guest speakers especially utility companies (NIPSCO, telephone, and water).
The allotted time with group sharing, brainstorming and creative interactions.
Curriculum writing.
More demos - maybe we could schedule a few of the daily - by the teachers.
Individual work time.
For 2 weeks - NOT 3.
Unit planning.
Lesson plans corresponding to a unified curriculum per school system.
Doing the same thing.
Guest speakers from other areas.
Self- scheduling.
With the workshop.
To develop courses for the coming year.
Activities that require teacher involvement.
Speakers from department of Education. Speakers from 2 year post-secondary school.
This program for different set of teachers.
All components.
Guest speakers. Specific lesson activity plans.
Activity development.
Yes.
Unit writing.
To work on units for Tech Prep.

delete:

Boring, needless speakers.
Too many guest speakers, please cut down!
Long session from 3 weeks to 2 weeks.
Nothing, only improve the formatting.
A lot of meaningless talk.
Different lessons taught by instructors.
Some of the outside speakers.
Some of the presentations.
Field trips.
Some faculty demos and lectures (sometime too long) and self-scheduled time.
Too many focus groups.
One week's time.
Speakers who do not involve audience
Nothing.
Lecturers over 15 or 30 minutes.
Wasted time people incorrectly signing in and out. It seems now that it doesn't pay to be honest.
Some of the time; two weeks should be sufficient.

expand on:

Establishing good grading ------- for developed lessons.
I believe that other Tech Prep subjects would be integrated into the program. As the lone English teacher, I learned about integrating math and science and as a result of this, I have also considered ways to integrate English and communication into science, math, etc.
Computer usage.
1. Innovative ideas on how to teach TP courses.
2. What to teach.
3. More guest speakers who actually know that they are doing.
4. Student portfolios.
Time for writing projects.
Include teachers that have tech prep classes in their schools. Pay should be increased to minimum of $25 per hour.

CC Time needed to create lesson plan, units or general classroom "hooker" activities.
D Things that can actually be used in the classroom.
E Writing TP curriculum.
EE Demos - more ideas - more chemistry.
F Guest speakers.
FF Hands-on experience.
H Integration for disciplines.
HH Corporate and industry contact.
II Using the computers for teaching.
J More hands on activities.
JJ Course writing and time to do them.
K Products produced. Participation by administrators-middle school teachers.
KK More faculty presentations/industry one hour time period.
L Working with computers in classroom and write up more units for Tech Prep program.
M Hands-on activities which could be added to certain units.
N More ways to get started on first year's courses.
P Writing units for next year's teaching. More dialog between different school districts, Merrillville and Gary, etc.
Q PACE II that dwells on use of available technology.
S The lecture from community like USX. Add NIPSCO, Gary-Hobart Water, Phone company, etc.
T Invite Industrial Tech teachers as well - They can integrate with all of '4' academics.
U Group work time - we had lots of ideas but could not expand on them because we didn't have enough time.
W Computer usage, peer group feedback of units.
Z The word processing workshop; should have been longer.

initiate:

* Feedback on training results for IVY TECH programs.
B Textbook writing and activity writing.
C Computer usage and/or fundamentals of wordprocessing.
CC Outside speaker presenters to cut down on value time we can use for unit writing, etc.
D More companies like USX that will be more specific as to their expectations of students.
E What actually happened in the classroom during 1994-95 school year. What activities gave good results, bad results, or no results? Student - behavior patterns? Attendance? Enthusiasm?
EE Other subjects possibly.
F Business leaders in communities to come in and share with us creative ways to introduce applications of what we teach.
H One/two weeks work with certain schools (3) with Tech Prep team from all disciplines. Take next 3 schools and work with those teams.
HH Sources of or knowledge of funding for equipment.
II Involvement with the administration and middle schools.
J Other subject areas such as English.
JJ More exchange of ideas and have math teachers work with science teachers in groups for more course work and activities.
K Better organization of time. Better communication of tasks to be done. A way or ways to find money to get equipment or supplies, ways to connect with companies to use with programs in the schools.
KK Demonstrate or give a clearer format at the start of session.
O 1. Bringing in middle school teachers.
2. Bringing in teachers from the pilot Tech Prep programs.
S More self-generated talks and interaction similar to our project demonstrations.
T Perhaps need 'teaching partners'. Groups that meet for short amounts of time so various groups can keep in touch with their progress and questions.
U Some self-scheduled hours transfer to class hours. (Maybe ask people to petition or apply for the transfer of these hours.)
Z Means of getting funds or grants to purchase materials and use resources for the Tech Prep in individual schools.

If funding is approved for a follow-up workshop next summer, how likely is it that you would want to attend?

* 100%.
A I would want to attend. I think I contributed to the Tech Prep Program from even though I am not science or math oriented. I would want to attend, definitely.
AA I would like to attend.
B I would like to attend.
BB Very likely.
C I would attend, however, increase stipend. We deserve it
D It is a positive possibility that I would attend.
DD Very Much.
E ?
EE Possibly - depending on schedule. 4 hours a day may be a bit long - perhaps 3 hours would be better.

[redacted]
E 90% chance. (Can you tell I'm a mathematics teacher.)
[redacted] I would be happy to attend if my schedule permits.
[redacted] I would like to attend.
H Very likely - The time is concentrated into a college setting so we actually get work done!
[redacted] Somewhat likely.
[redacted] Yes.
[redacted] I would attend.
JJ Yes.
[redacted] Definitely will attend.
[redacted] Just getting started, I believe I would like to participate.
L DEFINITELY!!!
M Almost sure.
[redacted] Very likely.
[redacted] .85
P Yes - if I could work on my units in the courses I will be teaching.
Q Very likely.
[redacted] Yes.
[redacted] Very likely.
[redacted] It really depends on how this school year goes. If things work well and I feel that I have something to contribute, sure! If I don't think I can help or get any encouragement, no.
[redacted] I felt I learned from this experience and would consider attending again.
[redacted] Very likely!
X Let's see what happens this coming year.
[redacted] I would like to attend again.
[redacted] I would be interested.

Last week, a Northwest Indiana teacher (not from Gary or Merrillville) was overheard to say that "Tech/Prep is [redacted]nother stupid idea pushed on the schools by the out-of-touch Indiana Legislature." What are your thoughts [redacted]bout such a comment?

* I feel the person making such a comment is not fully aware of the possibilities of improving the interest level of students in schools and the need for schools and industry to work together to improve the potential employee and his ability to increase production and quality of production.
[redacted] This sounds like a comment from an educator that doesn't want to grow with education and doesn't want to try new things.
AA Comment was unmerited. I was Tech Prep illiterate at first. Because of this workshop I am more informed and I believe Tech Prep has great possibilities.
[redacted] I think that teacher is old and is "learned out". That teacher does not fully understand the concept of TP. Ideally, TP is very innovative and appropriate for educating students in the 2nd and 3rd quarters.
BB I disagree. TP is a program that involves students and make them responsible for their learning. There is more hands on activities and students should be more likely motivated to learn.
[redacted] No comment.
D The ignorant will NOT inherit the earth.
DD There were also my thoughts at one time. However, since this seminar I've gained an insight into Tech Prep and I think its a good idea.
[redacted] This person should get out of education. He/she sounds like a person that doesn't like to improve himself or education.
[redacted] Person must not be aware of what Tech-Prep is.
FF This teacher is nearly burned out. I'm hoping that we as teachers, students, administrators, and partnerships work together to prepare our students for the real world. I believe this program can work with dedication and hard work.
[redacted] If the ideas of T-P are carried out as it should be, it is what is needed in our schools.
[redacted] I HOPE NOT! Everyone is not enthusiastic about learning. So here is a way to help get students interested in learning. I am always looking for new ideas and techniques to be used in my classroom.
[redacted] The comment is shortsighted and based on misrepresented facts or misconceptions about Tech Prep.
Does this teacher want to teach. He/she does not understand that Tech Prep is a methods approach designed to increase the level of competency of the middle range student.
J Tech Prep is a good idea. We need to help prepare our students for the world.
[redacted] This teacher is not informed that this is probably the best idea that the state of Indiana has started in education. This truly is the wave of education for the next century.
K I thought this way at first, but now I feel that his is needed
KK I believe that it is a good idea. If hands on and industry having input helps youngsters, then I'm for Tech Prep.
[redacted] Sorry buddy where have you been. I firmly believe Tech Prep is essential for survival and although this form of teaching demands more work, I liked the route and at most my students and I will be challenged and hopefully learn together.
M The above person probably had been out an needs to retire. We should use any or all available methods to motivate our children.
[redacted] That teacher should have attended our sessions this summer and he/she would not have made that statement, because he/she would now know what Tech Prep is all about.

O Before my participation in this workshop, that teacher may well have been me, who made that comment The out-of-toucans is on the part of the teacher concerning Tech Prep.

P It was initiated by business people I guess, but looking at our high schools today, it is a good idea. Give the students some purpose - some goals.

Q There are quite a few teachers that are happy being in a rut and doing the same thing the same way every year. I suspect this is one of those teachers.

S I understand their feelings, however, this must be given a chance. Remember many schools have just finished PBA.

T Tech Prep is a good idea, but after a few years, will we be allowed to keep it? The Indiana legislature changes it's mind so fast that the good idea must be held on to or lost.

U I agree that the legislature is out of touch but Tech Prep seems to be a great idea! Even though it looks good on paper, I hope that it is as wonderful in practice. Maybe this teacher was out of touch as to what Tech Prep is!

V I think our schools definitely need changing and Tech Prep is a good idea.

W The individual has a right to their opinion and I would first like to know if they know what Tech Prep is about.

X It looks to me like an outstanding appropriate, very timely program. We should have been doing this for some time I hope and expect it will be a more effective approach for dealing with our students.

Y I think only time will prove that they were wrong. If we keep it up and we will only get better.

Z I think this is the right direction. I like Tech Prep because it will meet the needs of many of our students. I do believe that we have many persons like the Northwest Indiana teacher who really do not have a good understanding of what Tech Prep is. We need to do more P.R. work.

How would you describe your present enthusiasm for tech/prep? Why?

* I am interested in students being able to "hit the ground running" when it comes to employment for the success of them as citizens and for the commu ity at large.

A I am enthused about Tech Prep. It makes sense and it will bring optimism and enthusiasm to students.

AA I would try to incorporate tech prep in next years curriculum if I had all my resources. I plan to use many of the ideas that I learned from this workshop.

B At this point in time, my mind is quite cloudy. The school that I am teaching at is not equipped to handle a TP curriculum. It is behind the times.

BB Very excited! Can't wait to introduce these new ideas to my students.

C I feel very good and more at ease at starting activities developed this summer. Meeting with other teachers and hearing their concerns and plans was areal boost.

D I am feeling very good about Tech-Prep because there has to be a better approach to reaching and teaching out students.

DD Very good, I think that the seminar proved that it can be successful.

E I am ready for a change. Tech Prep sounds like it might be the answer.

EE I believe it is a good idea and I'm fortunate to be a part of it. If we're going to improve society we're going to be a large part of it. We must prepare students with the proper skills and knowledge.

F Very good. Our administration is behind it. Personally, I am very tires of the old lecture/test style of teaching Students get very turned off by it.

FF I am going to do it! Children in my classes will leave with motivation for more.

GG Good, it gives another way of trying to reach the students in the 90's.

HH I have been enthused and am even more enthused about the projects for Tech Prep.

H Great. I'm anxious to try my new methodology in teaching the mid-range student.

H Our Tech Prep team is ready and eager to go. THANK YOU VERY MUCH!

J I am very excited about Tech Prep. I plan to use the ideas I learned next year.

JJ I feel that I have expressed my enthusiasm above and I am looking forward to starting Tech Prep in the fall.

K My enthusiasm has grown because I now know a little more.

KK I'm more enthusiastic because I'm better informed.

L I am excited, really pumped up because it has been my goal to apply teaching of Math to relevant, up to date applications, and experiments across the curriculum. I am still somewhat in the dark but as I claim ownership for this Tech Prep program will become clearer.

M I am not presently assigned to teach Tech Prep but I am looking forward to the experience. I will use many of the learned "Tech Prep" techniques in my other classes.

N My enthusiasm is very high. I wish I was the person who will be teaching the TP class next year. I am very excited to try some of my newly acquired knowledge on our students.

O 90% Gung Ho!! Programs have to be proven to be effective to get the other 10%.

P Right now it is high, but I am skeptical of how to get "the program" into the high school.

Q After these three weeks I'm sold on the idea. I will be bringing all this information to the attention of my principal, maybe even get on a curriculum committee. However, I'm afraid I'll meet much resistance.

S I'm ready to work - After 7 weeks of rest!

T An idea becomes a "good ides" when a person agrees with it. I found that I often used "Tech Prep" ideas, but didn't realize that's what it was. It is like being recognized and rewarded quietly.

U I am very enthusiastic about more practical hands-on teaching for Tech Prep. I've always felt that I learned more if I had manipulated it.

I am not scheduled to teach it at present but will try some of the ideas. I question how it will work with the group of low level students
Hopefully, they will do away with ability grouping before trying Tech Prep
I have always wanted to teach using the Tech Prep materials. It was the way I learned.
Hopeful - seems like a better way - fearful, if change is frightening and the change involved is as great as it seems. It's no wonder I'm somewhat scared. I'm not confident about my abilities. I just hope I'm equal to the difficult challenges ahead.
I'm very enthusiastic for Tech Prep. I think it is a great program.
I am very enthusiastic. This will give me some fresh ideas to spice up my lessons. It should get us out of a rut.

ther (Use the other side).

Your efforts in this enterprise are appreciated!
I learned a lot. I also have a desire to learn more. This is a necessary characteristic of an educator. If we grow with education our students will grow with education and therefore, our society will grow with education.
Technology wise - If I worked at a school that was able to handle a TP curriculum effectively, then I would be on top of cloud 9 instead of in it.
Overall, I'm glad to have been a part of the workshop and I appreciate the time and effort you've put in on this project. I hope we can all help each other in the future to be more productive educators.
Personally, we as teachers need help making contacts in the community to get applications to use as examples and resources. This is the area I believe teachers are most deficient in.
Some effort should be made to expose all the students in this state to the same level of technology. What we have as a high school would not compare to many elementary schools!
We need to stress workshops designed to increase the willingness of the middle level student to learn. Tech Prep will only work if a student wants to learn. A horse will not drink at the last water hole before the desert is he is not thirsty. We need to involve the middle level in Tech Prep because we will be teaching their products.
We need communication of workshops held in other areas of the state.
I want to say thank you to Dr. Schoon and Dr. Wiles for spending their enthusiasm and knowledge with me. Also thank you to Dr. Dustman, Dr. Galloway, and Dr. Votaw Also, Tech Prep should be a total program from elementary through high school.
The beginning sessions of the three workshops were extremely helpful. I really didn't know about Tech Prep, the speakers were very helpful and informative. I'm still confused how to set this all up in my school. It seems like I really need to communicate with the administrators in my building.
I did not like the long lectures, however, the guest on Thursday (USX) was GREAT!
Thank you. I enjoyed these weeks. Even hard work can be enjoyable. And I certainly benefitted from the time well-spent.
I was very frustrated by this workshop! Listening to many of the presenters gave me great ideas - but then I had to listen to so much hot air that I didn't have as much time to develop the ideas I had heard. Okay, it wasn't really hot air but some wasted time that could have been used better in the development of ideas.
I enjoyed the workshop and learned a lot. I have a better understanding of what we can do in our building and will work harder to implement the program.

Ratings of 38 Participants.

TP	count	count	Mo	AREA	Sort	FRM	A1	B1	C1	D1	E1	F1	A2	B2	C2	A3	B3	C3	D3
1	1	1	0	M	25	G	2	1	3	2	2	1	3	1	1	2	3	4	3
1	2	2	0	M	35	I	1	1	4	3	4	3	3	4	3	4	1	4	4
0	3	3	0	M	36	R	1	3	3	3	4	3	2	3	3	3	4	4	2
0	4	1	0	M	38	S	4	4	3	3	3	3	3	3	B	4	4	4	3
0	5	2	0	M	40	N	3	3	3	3	3	3	4	3	3	4	4	4	4
0	6	3	0	M	40	Q	4	3	4	4	4	3	4	3	4	B	4	3	3
1	7	4	0	M	41	B	4	2	3	3	4	3	4	4	4	4	4	2	3
1	8	5	0	M	41	E	3	3	3	3	3	3	4	4	3	4	4	4	3
0	9	6	0	M	41	P	4	4	3	3	4	3	3	3	2	4	4	4	3
1	10	7	0	M	42	K	3	2	3	4	3	4	4	3	4	4	4	4	3
0	11	8	0	M	43	D	4	4	3	3	3	4	4	4	3	4	3	4	3
1	12	9	0	M	43	F	4	3	3	4	3	3	4	4	3	4	4	4	3
0	13	10	0	ALGEBR	43	O	4	3	3	3	4	3	4	4	4	4	4	3	3
1	14	11	0	M	44	C	4	3	3	3	4	4	4	4	3	4	4	4	4
1	15	12	0	ALG/A/	44	L	3	4	4	4	4	3	4	3	3	4	4	4	2
1	16	13	0	M	45	J	4	4	4	4	4	3	3	3	4	4	4	4	4
0	17	14	0	M	45	T	4	4	4	3	4	3	3	4	4	4	4	4	4
1	18	15	0	M	48	H	4	4	4	4	4	4	4	4	4	4	4	4	3
0	19	16	0	M	48	M	4	4	4	4	4	4	4	4	4	4	4	4	3
	19				**686**		**60**	**54**	**54**	**55**	**58**	**53**	**60**	**57**	**52**	**60**	**63**	**60**	**51**
0	20	1	1	SCIENCE	38	U	3	4	3	3	4	3	3	3	2	4	2	4	3
1	21	2	1	BIOLOGY	38	DD	4	3	4	4	2	4	1	1	3	4	4	4	2
0	22	3	1	CHEM	39	W	2	2	4	4	4	4	2	3	3	3	4	4	2
1	23	4	1	CHEM	39	X	4	3	4	3	3	3	3	3	3	3	3	4	3
1	24	5	1	SCIENCE	39	JJ	4	2	3	3	4	3	4	3	4	4	4	1	3
0	25	6	1	SCIENCE	42	V	4	3	4	3	3	4	4	4	3	3	3	4	3
0	26	7	1	SCIENCE	43	Z	4	3	3	4	3	3	4	4	4	4	3	4	3
1	27	8	1	CHEM	43	EE	3	4	4	4	4	3	3	3	4	4	3	4	4
1	28	9	1	BIO/PH	43	FF	4	4	3	4	4	4	3	3	3	4	3	4	3
0	29	10	1	CHEM	44	AA	4	3	4	3	3	3	4	4	4	4	4	4	4
1	30	11	1	BIOLOGY	45	GG	4	4	4	4	4	3	4	3	3	3	4	4	3
0	31	12	1	PHYSICS	46	Y	4	4	4	4	4	4	3	4	3	4	4	4	3
1	32	13	1	SCIENCE	46	BB	4	4	4	3	4	4	4	4	3	4	4	4	4
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1	34	15	1	CHEM	47	II	4	4	4	4	4	4	4	4	3	4	4	4	4
1	35	16	1	BIOLOGY	48	CC	4	4	4	4	4	4	4	4	4	4	4	4	3
					687	**0**	**60**	**55**	**60**	**58**	**58**	**57**	**54**	**54**	**52**	**60**	**57**	**61**	**51**
0	36	1	x	M/S	44	*	4	4	4	3	3	4	4	3	3	4	4	4	3
0	37	2	x	ENG/M/	45	A	4	4	4	4	4	3	3	4	3	4	4	4	4
0	38	3	x		45	KK	4	3	4	4	3	3	4	4	4	4	4	4	3
10					**134**	**0**	**12**	**11**	**12**	**11**	**10**	**10**	**11**	**11**	**10**	**12**	**12**	**12**	**10**

A4	B4	C4	D4	A5	A52	B51	B52	C51	C52	D51	D52	E51	E52	F51	F52	G51	G52	H51	H52	I51	I52
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1	1	2	2	1	3	0	0	1	3	0	0	1	4	0	0	0	0	1	2	0	0
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30	**28**	**26**	**27**	**15**	**48**	**1**	**2**	**3**	**11**	**6**	**21**	**9**	**34**	**4**	**15**	**0**	**0**	**7**	**21**	**9**	**33**
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B	2	2	1	0	0	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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2	2	2	2	0	0	0	0	1	4	0	0	0	0	1	4	0	0	0	0	0	0
26	**29**	**33**	**32**	**2**	**5**	**10**	**35**	**10**	**31**	**2**	**6**	**7**	**24**	**6**	**22**	**5**	**17**	**4**	**9**	**3**	**7**
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B	2	3	1	0	0	1	4	0	0	0	0	1	4	0	0	0	0	0	0	0	0
4	**6**	**7**	**5**	**1**	**3**	**2**	**8**	**0**	**0**	**0**	**0**	**3**	**11**	**1**	**4**	**1**	**4**	**2**	**7**	**0**	**0**

J5	J52	K51	K52	L51	L52	A6	A62	B61	B62	C61	C62	D61	D62	E61	E62	F61	F62	G61	G62	A7	A72
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4	**14**	**8**	**24**	**6**	**23**	**16**	**52**	**16**	**58**	**15**	**50**	**15**	**47**	**15**	**52**	**14**	**45**	**15**	**53**	**14**	**54**
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1	3	1	3	0	0	1	3	1	4	1	4	1	3	1	4	1	3	1	3	1	3
1	**3**	**1**	**3**	**1**	**4**	**3**	**8**	**3**	**12**	**3**	**10**	**3**	**8**	**3**	**10**	**3**	**9**	**3**	**11**	**3**	**9**

B71	B72	C71	C72	D71	D72	E71	E72	F71	F72
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1	4	1	4	0	0	0	0	1	4
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1	4	0	0	0	0	1	4	0	0
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3	**10**	**2**	**6**	**1**	**3**	**3**	**11**	**3**	**8**