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ABSTRACT

During the 1996 Teacher Enhancement Institute (TEI) on the campus of Saint Vincent College in Latrobe, Pennsylvania, a very diverse group of teachers actively pursued instructional improvement through workshops in thinking skills, content area, and group seminars for a period of 4 weeks. This report contains evidence of improved teaching skills in science, mathematics, and classroom techniques gathered through pretest and posttest instruments, and interviews with faculty and participants. Both cognitive and affective domains were targeted by the TEI. Participants indicated significant growth in both areas. A major contribution of the TEI to teachers was reported as being the dissemination of new materials brought to them by the Saint Vincent College staff and by their peers in the respective workshops. It was concluded that the TEI participants experienced a positive change in affective and cognitive behaviors and attitudes through the activities during the time of the institute. (JRH)

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**Report on Effectiveness of Summer 1996
Teacher Enhancement Institute
At Saint Vincent College
Latrobe, Pennsylvania**

**Submitted September 30, 1996
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1996 Summer Teacher Enhancement Institute

Saint Vincent College

During the 1996 Teacher Enhancement Institute on the campus of Saint Vincent College of Latrobe, Pennsylvania a very diverse group of teachers actively pursued instructional improvement through workshops in thinking skills, content area workshops, and group seminars for a four week period. This report includes evidence of improved teaching skills in science, mathematics, and classroom techniques gathered through pretest instruments, posttest instruments, and interviews with faculty and participants. Both cognitive and affective domains were targeted by the TEI and in both arenas participants indicated significant growth. The teachers who participated in the workshops and seminars are talented and dedicated teachers who were more than adequate practioniers of the arts and sciences of teaching, but interviews and written examinations indicate that widespread improvements of skills and attitudes took place in the sessions of TEI again this summer.

A major contribution of the TEI to teachers was reported as being the dissemination of new materials brought to them by the Saint Vincent College staff and by their peers in the respective workshops.

Printed materials, apparatus, books, fieldtrips, thinking skills seminars, and collaborations were all mentioned as modes of acquiring methods and content knowledge. Another resource developed through the TEI involved gaining insights and locations for fieldtrips and out of school activities. A less formal but very useful component of the workshop wide interchange of teachers was reported as the feedback and informal sharing of ideas through large and small group sessions.

There were over sixty participants involved in the 1996 workshops and thinking skills seminar. Table one summarizes the characteristics of the participants and their schools. Public school teachers made up slightly more than one half of the participants with private and parochial school teachers making slightly less than one half of the population of the participant group. The largest group of participants according to grade level of teaching assignment were the elementary teachers. The smallest group of participants according to teaching assignment were the faculty who identified themselves as being junior high school teachers. The middle school teacher group overlap the elementary level and the secondary level and made up the second largest group according to level of teaching assignment.

In this 1996 teacher enhancement institute slightly more than twenty-two per cent of the participants had previous experience in Saint Vincent College summer teacher enhancement institutes. This makes a remarkable seventy-eight per cent of the participants first time institute members. A great part of the repeat participants were identified as teacher mentors in subject area workshops. The highest earned degrees of the teachers involved in the TEI ranged from associate degrees up to the doctorate.

The greatest number of participants were individuals who earned a bachelor's degree but had no higher degrees. A very significant portion of the participants have earned a master's degree in some field or education.

Particularly positive impact of the 1996 Saint Vincent College TEI is indicated in Table Two . Clearly a positive impact on teaching career awareness was accomplished both in regard to general career awareness in application of math and science but also in regard to career opportunities in math and science fields available to women and minorities. The pretest found about thirty-seven per cent of the teachers had been including career awareness in their curriculums. Posttest scores report over ninety per cent of these teachers expect to teach career awareness in the future. The data shows an increase in career awareness units for women and minorities from a reported fifty-nine per cent at pretest to a over ninety per cent level after the workshops and seminars. Data definitely indicates an improved attitude and increased attention for career awareness for all students but also, there is a marked increase of attention to career awareness in science and math for minorities and women.

The specific content and curriculum impact was measured through a self-examination by the participants with a Likert Scale Instrument. The validity of the instrument was established by content and criteria validity evaluations by staff and faculty consultations. The reliability of the instrument was reported as 0.84 on the Kuder-Richardson formula 21 . This level of the r value is acceptable for instruments used to evaluate data in educational and psychological test situations.

Results are reported as means for the various items and as analysis by comparison of pretest and posttest through the t test statistic on Table Three and on Table Four respectively.

Table Three summarizes Likert score means for all items on the Curriculum and Content section of the instrument. Rows report pretest means, posttest means, and differences of these means as a gain score. Item seventeen is an exception to the gain score as a result of that item being an inverse question. In addition three other items are reported as negative gain scores. These items include number two, four, twenty-six. As previously stated the negative gain score for item seventeen indicates that participants in increasing commitment perceive that hands on manipulative based lessons are suitable for all levels of student abilities. An evaluation of items two, four, and twenty-six are required. In retrospect these questions may not be valid in terms of the objectives of the institute. To some degree a positive gain score on these items would indicate a positive movement of participants on the Kohlberg Hierarchy of moral reasoning. This factor was not a pre-set objective of this TEI. Objectives of the seminars and workshops are defined more clearly in terms of the cognitive and affective domain in areas of content and areas of instructional techniques.

It is also possible that since these scores both on posttest and pretest are approaching the maximum mean value of seven little increase can be expected. In the area of teacher esteem the TEI has produced a marked improvement. The improved teacher feelings of self fulfillment and esteem can be seen in Tables Three and Four in the data of item thirty three for secondary teacher participants

and item thirty four for elementary teacher participants. Secondary teacher identification with counterparts in the scientific community is clearly improved through institute activities. The confidence of elementary teachers as foundation builders and important parts of the total science and math learning experience by a strong surge in the data mean for item thirty-four. Growth in positive teacher behaviors and attitudes toward manipulative, hands on, and inquiry in the classroom is a clear conclusion drawn from the analysis of the data.

Item twelve information deals with participant involvement in the current literature of teaching of science and math. Increased use of periodical literature in any field leads to innovation and confidence. A reawakening of the teacher scholar identity of the TEI participants is seen in this part of the data. This increase of strength of the scholarly commitment is indicated by data reported in items nine, twenty three, and thirty.

In conclusion, the data gathered supports the assertion that 1996 Saint Vincent College TEI participants experienced a positive change in affective and cognitive behaviors and attitudes during the activities of the institute. The workshop was the only factor that all participants had in common at this time it is reasonable to assert that it was the institute that produced these results. Interviews with participants strengthen the assertion that professional growth resulted from TEI. There is a building of colleague relationships during the seminar that when coupled with fall and spring meetings that further nurture positive teacher attitudes and behaviors. Cooperative projects like the Middle School Science Newsletter and the Middle School Field Manual for Science continue to build on the foundations of the

summer sessions. Statistical evidence previously discussed supports a conclusion that participating teachers go back to their schools this term more confident in subject content, more confident in instructional techniques, more confident in their own scholarship, more aware of instructional needs in career areas and needs of women as well as minority pupils. Further this improved confidence is warranted as it is based of application of seminars and workshops along with cognitive learning in those arenas.

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Table One

General Information and General Goal Analysis

Participant Professional Profiles

50.7 % reported being part of a public school faculty
47.6 % reported being part of a parochial school staff
1.5 % reported being part of a private school faculty
30.2 % reported being part of an Instructional Team
41.3 % reported being primarily a K - 6 teacher
34.9 % reported being primarily a Middle School teacher
17.4 % reported being primarily a Junior High teacher
22.2 % reported being primarily a Senior High teacher
22.2 % reported having previous SVC TEI experience
7.9 % reported mentor status for this TEI

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Table Two

Goal Expectations and Expectations :Affective and Cognitive

(Pretest data)

- 11.1 % report significant use of computers in the classroom
- 31.1 % report significant use of calculators in their classrooms
- 30.2 % expect to apply TEI training to helping other teachers through In Service
- 96.8 % expect to apply TEI Learning skills training to their teaching
- 90.4 % expect to add career awareness lessons to their classrooms
- 36.5 % previously included career information in science and math in classes
- 53.9 % previously included career awareness for women and minorities
- 93.6 % plan to applying TEI applications of learning technologies

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Table three

Summary of gain scores on Part Two

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Pretest	5.98	6.15	6.29	6.67	6.94	6.06	6.03	4.49	4.63	5.00	6.18	4.32	4.92	6.15	5.92
Posttest	6.03	6.66	6.92	6.49	6.58	6.71	6.46	5.85	5.71	5.37	6.67	5.30	5.05	6.54	6.47
Gain score	.05	-.41	.63	-.18	-.36	.65	.43	1.39	1.08	.36	.49	.98	.13	.39	.55
Pretest	5.24	2.43*	4.98	5.67	5.62	5.87	5.30	5.69	6.16	6.38	5.89	5.98	4.84	5.09	5.93
Posttest	5.32	1.5*	5.59	5.71	5.86	6.67	5.77	5.74	6.61	6.61	5.77	6.31	5.00	5.93	6.96
Gain Score	.08	.93	.61	.64	.16	.80	.47	.55	.45	.23	-.12	.33	.16	.09	1.87

Table three continues

	31	32	33	34
<i>Pretest</i>	5.931	5.35	2.83	3.47
<i>Posttest</i>	6.20	6.15	5.45	6.84
<i>Gain Score</i>	.27	.80	2.65	3.37

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Table four

Summary of Analysis of data from the Content and Curriculum Self Study

Likert Scale evaluations from data in table three

- 7. = *Strongly Agree*
- 6. = *Moderately Agree*
- 5. = *Slightly Agree*
- 4. = *Neutral*
- 3. = *Slightly disagree*
- 2. = *Moderately disagree*
- 1. = *Strongly disagree*

<u>Item</u>	<u>Level of significant improvement of gain reported on t test</u>
Item # 3	I have a commitment to the field of science or/math. .05
Item # 6	My understanding of science / math is adequate. .05
Item # 7	As a teacher of science/math I am worthy of respect in the content. .02
Item # 8	I am an expert in my content knowledge of science/math. .01
Item # 9	I design learning centers in science/math that are excellent..... .01
Item # 11	I have the ability to produce problem sets , bulletin boards, study guides, handouts, tests, quizzes, and other teaching materials of high quality for use in my classes. .05
Item # 12	In my person reading I include on a regular basis articles from such periodicals as <u>Science & Children</u> , <u>Science Scope</u> , <u>Popular Science</u> , <u>Scientific American</u> , <u>Arithmetic Teacher</u> or <u>NCTM Publications</u> .05
Item # 15	I feel very comfortable and confident in using inquiry type lessons .05

Table four continues

Item # 17	Many students are not bright enough to be involved in laboratory lessons in science or math.	.02
Item # 18	I would do more laboratory lessons in science and math if my school supplied me with more equipment and materials.	.05
Item # 21	I understand the interrelationships of the various areas of science & math	.05
Item # 22	I have no person discomfort with mathematics	.05
Item # 23	I have no person discomfort with the natural sciences	.01
Item # 27	Any one can learn science/math if the subject is properly taught	.01
Item # 30	As a result of TEI I will an even better teacher of science/math01
Item # 32	I have a definite philosophy of science/math teaching	.01
Item # 33	If secondary or middle school, I share the philosophy of my subject area with practicing scientists	.01
Item # 34	If elementary, I believe that as a foundation builder I am at least as important to the students any other science/math teacher	.01

(t tests performed with Texas Instruments T 35 Calculator using methods described in Isaac, Stephen and Michal, William. Handbook of Research and Evaluation. (EDITS, San Diego)1975.)



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