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ABSTRACT

A study was conducted to ascertain the extent to which colleges and universities are integrating new technology education curriculum activities into teacher inservice and professional development programs. Information was gathered by developing a questionnaire, pilot testing it, and mailing it to 50 selected colleges and universities for completion. Twenty-nine usable questionnaires were returned (58 percent). Each of these 29 institutions reported sponsoring at least one inservice activity in the past year. The inservice activities provided typically emphasized new technologies and teaching methods consistent with contemporary directions in technology education. Inservice topics were typically selected and planned with some form of teacher input. University personnel assumed the leadership role in a large majority of inservice events. Summer workshops and teacher institute days were the most common formats for the delivery of inservice professional development. Two-thirds of the institutions reported assuming some of the financial responsibility for inservice activities. Little or no follow-up or evaluation of the outcomes of inservice activities occurred. The following recommendations were made: the technology education profession should develop a publication that highlights and publicizes exceptional inservice and professional development activities; stakeholders in technology education should collaborate to increase the involvement of teachers in the preparation and evaluation of inservice activities; and more efforts should be made to evaluate and follow up inservice activities. Appendixes include the survey instrument, a list of institutions participating, respondents' comments, and a sample agenda from a teacher's conference program. (Contains 22 references.) (KC)

Professional Development for Technology Education:

Results of a National Study

By:

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Professional Development for Technology Education:

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The training, updating, and inspiring of teachers-in-practice is a large field of endeavor, heavily criticized, extensively pursued, and vitally essential. In-service training sessions, after-school courses for credit, extended course work for degrees, conferences, workshops all compete for the attention and favor of practitioners. All contribute--often one-by-one--to the upkeep and maintenance of the teacher in practice. (Cordeiro, 1986, p. 705)

Many exciting technology education programs are being developed and implemented across the United States. State-wide implementation of technology education has occurred in a number of states such as New York, Illinois, Virginia, and Indiana. Additionally, well publicized regional technology education programs have emerged in locations as diverse as Delta, Colorado, and Pittsburgh, Kansas. These efforts toward implementation of technology education have aroused wide interest in the study of technology and have contributed to the rapid growth of contemporary curriculum materials.

The process of implementing technology education curricula is a complex undertaking that requires a change of philosophy, curriculum, and instructional practices. The dissemination of these new ideas and practices is largely contingent upon effective in-service* programs (Boser, 1991). The extent to which these elements of effective program implementation are presently included in technology teacher professional in-service activities is unclear, as is the role being played of college and universities. In order for colleges and universities to pursue an active and positive leadership role toward addressing the in-service needs of secondary technology teachers, it is necessary to ascertain their current level of involvement.

Background Ideas

Technology education is emerging as a primary discipline for providing students with the technological wherewithal to survive in a very technical and rapidly changing world. If students are to be prepared, so must their teachers. College and university in-service and professional development activity is an essential element in helping teachers develop and update their technological and instruction capabilities. In-service should also ease the transition from industrial arts programs to technology education programs. Clark (1989) pointed out the difficulty of this task:

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* Note: In the interest of brevity, the term "in-service" will be used to refer to "in-service professional development" activities.

> Through various means, thousands of administrators, educators, and ancillary staff members have been exposed to technology education... Still, the unit shop remains the primary delivery method in the field... This serves to accentuate the scope of the crisis, and the professional reaction (or lack thereof) to it. It appears that many efforts in the movement toward technology education have failed because changes have been made in name only, rather than the instructors' understanding philosophical differences between industrial arts and technology education. (p. 7)

Similarly, Wilkinson (1990) observed that often as we visit technology education programs, we continue to find little, if any, progress toward the new philosophy--our teachers have become lost in the transition. Colleges and universities have the expertise and are in a position to assist teachers with this transition to technology education. Teacher educators have the opportunity to provide classroom teachers with the philosophical and practical knowledge to implement an exemplary technology education program.

History of In-service

Providing technology education practitioners with high quality professional development activities and in-service workshops which enhance their teaching abilities is not a new idea. Colleges and Universities have long provided in-service professional development activities for secondary teachers. Richey (1957) noted that "staff development efforts in American schools can be traced to the initiation of the teacher institutes [normal schools] in the early 19th century" (p. 2).

More recently, research on in-service practices has focused new and increased attention on its contributions to curriculum change. Guskey (1986) stated that, "Advances in research on effective schools and the variables that contribute to instructional effectiveness have increased attention on the need for high quality staff development programs" (p. 5). Often, staff development activities are required to qualify for merit pay or the designation as a master teacher in many secondary and state school systems (Duttweiler, 1988). Additionally, these programs of in-service have become a requirement for teaching staff renewal and have been state or locally mandated as a part of contractual and certification agreements (Mulhern & Buford, 1986; Guskey, 1986). Although in-service and staff development activities have begun to be mandated at the local and state levels, contractual agreements are not usually the primary reason for teachers taking part in the staff development. Guskey pointed out that, "Although it is true that teachers are usually required by certification or contractual agreements to take part in various forms of staff development, most teachers engage in staff development because they want to become better teachers" (p. 6). Recognizing the importance of in-service to classroom

teachers and the technology education profession, the question of how to implement an effective in-service program still remains.

Effective In-service Methods

Developing effective in-service programs for technology education practitioners requires extensive planning and follow-up, which in many cases is hard to validate. Lambert (1988) stated:

> In the past our primary means for effecting the capabilities of teachers has been staff development. We have packaged innovations and delivered them to the teachers through direct instruction. We have given the teachers the information, demonstrated it, used guided practice, and then hoped that the teachers will somehow get the practice, feedback, and coaching in the field. (p. 665)

The lack of effective practice, feedback, and coaching in the field has been a major flaw in the in-service model that has been perpetuated by workshop presenters over generations. However, Browne and Keeley (1988) indicated that effective follow-up is a problem often overshadowed by poor presentation planning and methodology. The authors suggested that the lecture method of instruction is an overused presentation method used primarily because of ineffective planning. Brown and Keeley stated that "Lectures should not be the primary format for faculty workshops. Participants in instructional development workshops need time to design a plan for how the suggested improvement could be integrated into their classroom" (p. 98). Similarly, Guskey stated that, "To be effective, a staff development program must offer teachers programs that they believe can potentially expand their knowledge and skills" (p. 6).

Effective in-service appears to be predicated on delivering immediately useful teaching materials and methods. Cordeiro (1986) declared:

> Teaching lore holds that practitioners attending workshops and courses look for . . . things that work, . . . little tricks and gimmicks, . . . the nuts and bolts . . . that can be put into class the next day. Workshops which only offer theory may be poorly attended. After school courses which are not "practical" are, in the words of a colleague of mine, "the pits." (p. 705)

These sentiments where echoed by Calabrese and Boswser (1988) who stated that, "Maximizing involvement of the participants is a major component that is essential to the success of any in-service program" (p. 63).

Using innovative presentation methods and evaluation procedures is particularly important when relating new or challenging information, similar to the type offered in most technology

education workshops. Love (1991) indicated that teachers need to feel the technological material they are learning is meaningful and helpful to themselves, their school district, and the community. Further, teachers need time to develop one strategy in depth and implement it, instead of trying to superficially learn many strategies. LaRose (1988) stated that "A successful staff development program must serve two functions. It must meet the individual teachers' needs and also the needs of the institution" (p. 33). Moreover, according to Love, it is important that teachers receive the monetary, time, professional and social support needed to accomplish the in-service goal.

Successful teachers know a lot about learning, and are themselves very good at it. In decrying poorly conceptualized and impractical teacher education programs, practitioners are asking simply to learn something useful (Cordiero, 1986).

Importance of Teacher Involvement

Learning is enhanced when participants are active and motivated. Securing genuine teacher interest in in-service activities often involves overcoming long-held preconceptions about the type of content and presentation methods typically used. Therefore, increasing the number of in-services may not facilitate change unless the workshops truly reflect teachers immediate classroom needs.

Salpeter (1989) stated that "Research conducted by the Office of Technology Assessment points to the lack of adequate in-service training as a barrier to the widespread use of technology in education" (p. 20). Further emphasizing the importance of content selection, Cordeiro (1986) reported that "Technology education teachers see the development efforts they need as being remote and unknown to those who teach the teachers" (p. 6). Yatvin (1987) described the current in-service model as:

> Two fifths is show, two fifths are ideas and products that are to abstract to apply easily, and the remaining one fifth is hopefully useable material, but often ephemeral, slipping from the memory before it has a chance to be used. (p. 92)

Teacher educators are not alone in garnering low marks for presentation of in-service materials. Blair (1988) stated that "teacher in-service activities are weak due to the fact that the workshop leaders are often beleaguered administrators or supervisors who do little preliminary planning" (p. 55). Lodge (1988) added that, "Another problem is the specific content of the workshops and in-services that are available. Too many courses are poorly planned" (p. 18).

Moreover, many current in-service offerings may not be achieving their intended purpose of facilitating classroom change. Cruickshank, Lorish, and Thompson (1979) suggested that the traditional model of in-service education, rather than eradicating deficits and providing updated

curriculum and methodology, is seen by the classroom teacher as a method of obtaining college credit and extending professional growth. Lodge (1989) suggested that, "Teachers are more likely to choose the least expensive and most convenient in-service sources, instead of extended, challenging, or applicable course work" (p. 18).

To overcome the above mentioned problems of in-services, workshop planners must listen to the customer, the classroom teacher. Historically, teachers have either not been involved or have not taken the initiative to participate in the planning and development of in-service activities. Colleges and universities can prepare more effective in-service workshops and enhance their position by actively involving classroom teachers in the planning and development of in-service programs.

Role of Colleges and Universities

In-service education is the most effective method of providing existing classroom teachers of technology education with updated information on curriculum, methodology, and technology. These professional development opportunities are offered by many educational and governmental agencies and are often mandated through contractual and certification agreements. Technology teacher education departments at colleges and universities are in a unique position to offer change-based in-service workshops while satisfying mandated attendance requirements. These institutions provide contemporary pre-service technology teacher education. As such, university personnel are aware of state-of-the-art technology programs and instructional methods. The linkage between the university and practicing teachers is obviously mutually beneficial. Through collaboration, in-service programs may be developed that meet current needs while continually moving the local technology program toward the most contemporary examples of technology education.

Purpose of This Research

In order for the technology education profession to move forward, classroom teachers of technology education must be provided with appropriate in-service and professional development programs which allow them to make philosophical and programmatic changes that ultimately augment technology education. The purpose of this research was to ascertain the extent to which colleges and universities are integrating new technology education curriculum activities into teacher in-service and professional development programs. By identifying the degree of involvement and types of technology education in-service activities currently being delivered by colleges and universities, the leadership of the profession could more accurately affect future directions and programs for teaching practitioners.

Based on the purpose of this study, the following research questions were investigated:

1. To what degree are colleges and universities involved in delivering contemporary technology education in-service activities?

2. What type of in-service activities are offered to teachers by colleges and universities?

3. To what extent are colleges and universities integrating new technology education curriculum activities into teacher in-service programs?

4. What methods are used to deliver technology education in-service activities?

5. Who is participating in in-service activities?

Methodology

The purpose of this study was to ascertain the extent to which colleges and universities are integrating new technology education curriculum materials into technology education teacher in-service. The information necessary to complete this study was collected by developing a questionnaire, pilot testing it, and finally mailing the questionnaire to selected colleges and universities for completion.

Due to the relatively large size of the population, the instrument chosen for the study was a mailed questionnaire. Fink and Kosecoff (1985) suggested that the mailed questionnaire is the most reliable and valid method of obtaining large amounts of information from groups economically. The pilot study questionnaire was developed by the researchers and mailed to 15 regional institutions derived from the same population later used in the research. The objective of the pilot study questionnaire was to validate and establish reliability in the instrument. Twelve of the 15 pilot study questionnaires were returned for a 80% return rate. Adjustments and corrections to the questionnaire were made after completion of the pilot study and follow-up analysis.

The instrument for this study was mailed during the second week of November, 1992. A return date of December 15, 1992, was requested. The questionnaire and accompanying cover letter were sent by mail to 50 selected colleges and universities who were previously identified as having graduated more than five new teachers in 1991. The questionnaire is presented in Appendix A.

Population and Sample

One of the difficulties of assessing the degree of in-service activity specifically occurring in technology teacher education is the identification of institutions that are actually preparing teachers of "technology education." The original intent of this research was to survey all institutions who reported five or more graduates of industrial or technology education as reported in the *1991-92 Industrial Teacher Education Directory* (Dennis, 1991-92). However, it is not always easy to distinguish between programs that prepare teachers of technology education as opposed to those programs preparing traditional industrial arts teachers.

Householder (1992) addressed this problem in a recent survey designed to ascertain the number of graduates of technology education programs available for teaching positions in 1992. As part of the study, Householder identified a population of institutions that specifically prepare teachers of technology education. Householder's listing of institutions seems to be the more accurate source from which to draw a sample. Therefore, institutions selected for inclusion in this study reported the graduation of five or more Technology Education teachers in the study by Householder. The researchers decided to focus on institutions with five or more graduates per year assuming that these institutions would be more active in providing in-service activity in their state or region.

Findings

Of the 50 institutions surveyed, 35 questionnaires were returned. No follow-up of non-respondents was undertaken. A list of the institutions that were mailed questionnaires is presented in Appendix B. Of these 35 questionnaires returned, three institutions reported no in-service activity in the past year and three questionnaires were returned but not completed. In total, 29 useable questionnaires were returned for a response rate of 58%. Each of these 29 institutions reported sponsorship of at least one in-service activity in the past year. Responding institutions were located in at least 22 states (one questionnaire could not be identified by state). Table 1 lists the number of in-service activities reported by the institutions.

Coordination

Two survey items attempted to determine the degree of involvement colleges and universities have in organizing in-service activities. Specifically, survey items asked, "Who coordinates the in-service program in your state?" and "Who typically leads those workshops?"

Table 1. Number of In-service sessions offered by responding institutions (n=29).

In-services Offered	Number of Institutions	Percent of Institutions
1-3	9	31%
4-6	9	31%
7-9	2	7%
≥10	9	31%

Fifty five percent (n=16) of responding institutions reported a coordinated program of Technology Education in-service in their state. Program coordination used a variety of formats which often involved a cooperative effort between a State Department of Education and a university or college, and/or the state or professional association (n=9). Five institutions reported that a government department was the sole coordinating agency in their state, and in two instances a university was identified as the state coordinating agency. These findings indicate that universities and colleges appeared to be active partners in states with coordinated in-service programs.

University personnel were very active in the leadership of in-service and professional development. As indicated in Table 2, 27 of 29 institutions offered in-service sessions lead by university personnel (93%). Not listed on Table 2 but specifically mentioned in the "Other" category were: (a) State Department of Education personnel, (b) university personnel and/or graduate student support, and (c) representatives from various areas of education such as the district superintendent.

Table 2. Leadership of in-service professional development events (Respondents checked all that applied. Maximum n=29 in any category).

In-service Leader	Number of Workshops	Percent of Institutions
University personnel	27	93%
Classroom teacher	16	55%
Business or industry personnel	9	31%
Consultant	9	31%
Other	3	10%

Type of In-service Activities

The effective implementation of a technology education program requires that the teacher develop new technological skills in addition to changing educational philosophy, curriculum, and instructional methods. To understand the goals of current in-service activity and to determine the degree of change toward new technology education content, respondents were asked to indicate which of the listed elements of change were the focus of their in-service programs. Table 3 reports the focus of in-service activities.

Technology update sessions (n=25) and curriculum development (n=24) were the most common focus of in-service programs. It may be encouraging to note that only 14 institutions reported sessions focusing on the philosophy of Technology Education. This may indicate that, in many areas, teachers have an understanding of the philosophy of technology education (usually a first step in the implementation process) and that in-service events can now devote increasing amounts of time to issues such as curriculum implementation.

Table 3. Major Focus of In-service Professional Development Events. (Respondents checked all that applied. Maximum n=29 in any category.)

Focus of In-service	Number of institutions	Percent of Institutions
Technology update	25	86%
Curriculum development	24	83%
Student learning activities	19	66%
Teaching methods	18	62%
Curriculum integration (Math, Science, & Tech.)	16	55%
Philosophy	14	48%
Other (Classroom research)	4	14%

In-service Topics

The 29 responding institutions collectively reported 74 specific topics of in-service activities that spanned a wide range of contemporary issues in technology education. A complete listing of in-service topics reported by respondents is presented in Appendix C. Consistent with the emphasis noted on technology update in-service activities, the majority of

topics were designed to expand teachers knowledge and skills in technological areas. Many of these technology update topics specifically addressed computer applications and operation. In-service topics most often mentioned by the respondents included: robotics (7), Principles of Technology (6), CAD (4), integrated academics or mathematics, science, and technology integration (4), CNC (3), desktop publishing (3).

One responding institution included with their returned survey an example of their teacher's conference program. The conference program was directed toward teachers, students, administrators, and guidance personnel and covered a wide range of contemporary topics in technology education such as "Activities in materials testing", "Environmental issues in technology education", and "Teaching product design." The complete conference program is presented in Appendix D.

Selection of In-service Content

Respondents reported that in-service topics were typically selected and planned with teacher involvement. Institutions reported various forms of teacher participation. Specifically mentioned were (a) direct teacher input (n=23), (b) workshop committees (n=6), (c) a district teacher meeting (n=1), and (d) collaboration between university faculty members, school district administrators, and teachers. The second most common approach was to have the content determined by university personnel (n=22). Other sources for the selection of in-service content were state plans (n=9), conceptual framework for technology education (n=3), and grant programs (n=1). It is interesting to note that the majority of in-service topics are determined by teachers or university personnel and not specifically selected through the guidance of a state plan or conceptual framework.

Instructional Methods

If the medium is the message in in-service activity, and if modeling really is an meaningful educational concept, then it is important to understand the types of instructional methods used to deliver in-service activities. In keeping with the traditions of technology education, both hands-on activities and demonstrations were frequently mentioned instructional delivery methods. Perhaps reflecting the philosophy of technology education, small group activities were also widely used. The venerable lecture obviously still has a place for delivering information quickly to large groups. Methods that were mentioned under the "Other" category included independent study, practicum, and technical occupational experience. Instructional methods used for the delivery of in-service events are reported in Table 4.

Table 4. Instructional Methods Used at In-service Events. (Respondents checked all that applied. Maximum n=29 in any category.)

Methods	Number of Institutions	Percent of Institutions
Hands-on activities	27	93%
Small groups	25	86%
Demonstration	22	76%
Lecture	18	62%
Seminar	13	45%
Other	6	21%

Scheduling Format

Nineteen institutions (65.5%) reported that in-service credits were required by teachers for continuous certification in their State. In attempting to meet this demand, institutions reported using a number of scheduling formats to deliver in-service and professional development programs. By far the most common vehicle used for in-service was summer workshops, which were offered by 93% (n=27) of the responding institutions. College credit was reported to be available for summer workshop participants in 66% of institutions. College credit was also available for all continuing education programs (n=7), and 87% of in-service events scheduled on weekends. Additional formats reported were: (a) spring conferences, (b) local association meetings, (c) consultation sessions, (d) occupational experiences, and (e) individual independent studies. A listing of the in-service formats is presented in Table 5.

Table 5. Type of In-service Professional Development Delivery Format Used by Universities and Colleges. (Respondents checked all that applied. Maximum n=29 in any category.)

Type of In-service Delivery Format	Number of Institutions	Offered for Credit
Summer workshop or course	27	18
Teacher in-service/institute day	14	2
Weekend	8	7
After school workshop	9	3
Continuing education	7	7
Other	4	0

Attendance

The average number of participants at the in-service events is reported in Table 6. Nineteen of the 29 institutions estimated average attendance at workshops to be in the range of 11-20 participants. The objective of the questionnaire was not to find out the total number of teachers served by in-service events, however some insight can be gained from the responses of these institutions. By using the most conservative estimate of the total number of in-service events offered (n=149, see Table 1), times the average number of participants (n=18.7), one can estimate that approximately 2790 teachers were served by this group of institutions.

The weighted average attendance of 18.7 participants was estimated by multiplying the mid-point of each interval times the number of institutions reporting attendance in the interval, summing the interval totals, and, finally dividing the participant total by the total number of institutions. For example, 19 institutions reported in-service attendance of between 11 and 20 teachers. For this interval the number of teachers participating was estimated at 15 times 19, or 285 teachers. Summing the participant totals for the first three intervals and adding the specific attendance numbers of 30 and 48 in the last interval equalled 543. Dividing 543 by 29 equals 18.7 participants per session.

Table 6. Average Number of In-service Participants in Attendance at a Typical In-service Event (n=29).

Participants per Session	Number of institutions
1-10	1
11-20	19
21-30	7
≥ 30*	2

(* 30 and 48 participants reported in attendance)

Financial Responsibility

The data suggested that 66% of colleges and universities are financially responsible for at least some of the in-service events they offer. State departments of education played a role in funding in-service at 41% of the institutions. One institution, which reported delivering more than 10 in-service activities, stated that grant or project monies paid for most activities. Given ever shrinking college budgets and the high level of institutional funding of in-service activity, one begins to wonder if budget reductions are also reducing the number of in-services offered. Or, perhaps the financial sponsorship reported by institutions more accurately reflects graduate courses in technology education. A listing of the agencies responsible for funding in-service events is presented in Table 7.

Table 7. Agency Financially Responsible for In-service Activities. (Respondents checked all categories that applied. Maximum n=29 in any category.)

Agency Financially Responsible	Number of Institutions	Percent of Institutions
College or University	19	66%
State department	12	41%
Grant funding	7	24%
Local school district	2	7%
Technology Education Association	1	3%

Demographic Data on Participants

The respondents were asked to provide demographic data for the typical in-service participant. This information was used to better understand and develop a profile of technology education teachers who regularly attend in-service activities. The average in-service participant was between 31 and 40 years old, had between 5 to 12 years of teaching experience, had a Masters degree, and taught in the high school setting. This information did not appear to be easy to estimate and approximately 25% of respondents did not complete this section of the survey. Tables 8, 9, and 10 presents a tabulation of participants average age, years of teaching experience, and type of school in which they taught.

Table 8. Estimated Age of In-service Participants (Respondents checked all categories that applied. Maximum n=29 in any category.)

Average Age	Number of Institutions	Percent of Institutions
21-30	1	3%
31-40	11	38%
41-50	5	17%
Combined Intervals	4	14%
Missing	8	28%

Table 9. Years of Teaching Experience of In-service Participants (Respondents checked all categories that applied. Maximum n=29 in any category.)

Years	Number of Institutions	Percent of Institutions
1-4	0	0%
5-8	6	21%
9-12	7	24%
> 12	4	14%
Combined Intervals	4	14%
Missing	8	28%

Table 10. Type of School Where In-service Participants Taught (Respondents checked all categories that applied. Maximum n=29 in any category.)

Type of School	Number	Percent
K-6	0	0%
Middle/Junior High	2	7%
High School	7	24%
Middle and High School	13	45%

Effectiveness of In-service Activities

Respondents were asked to evaluate the outcomes of the in-service activities. Twenty-four of the respondents completed this section. Fourteen institutions (48%) reported that the workshop content had been implemented, nine (31%) noted that change was evident, and one institution reported that the outcome was unknown. On a yes-no question, 11 institutions reported that data had been gathered on the effectiveness of any in-service activities offered during the past year and 18 (65%) reported no follow-up activity. Types of follow-up included after session evaluation forms and follow-up questionnaires to teachers. Of those institutions that

reported no follow-up workshop evaluation, one respondent noted that the office of continuing education fulfilled this function.

Participant Support

The last area explored in this study was the way in which classroom teachers were supported or reimbursed for attending in-service activities. Typical types of support included release time, travel reimbursement, and paid substitute teachers. Other forms of teacher support noted by respondents included "recertification points," and software manuals, such as AUTOCAD, provided by vendors. Almost half of the institutions reported "no support" for participating teachers. Table 11 presents a tabulation of the ways in which teachers were supported and the source of that support.

Table 11. Types of Financial Support Provided to Teachers For Attending In-service Activities (Respondents checked all categories that applied. Maximum n=29 in any category.)

Type of Support	School District	State	Grant	Other	Totals
Release time	9	2	1	1	13
Travel expenses	8	4	2	0	14
Paid substitutes	9	2	1	0	12
No support					14

Summary of the Findings

Based on an interpretation of the data gathered in this study, the following conclusions were drawn:

1. Colleges and Universities that are active in pre-service technology teacher preparation are actively involved in in-service and professional development for classroom teachers.

2. In-service activities provided by this group of institutions typically emphasized new technologies and teaching methods consistent with contemporary directions in technology education.

3. In-service topics were typically selected and planned with some form of teacher input.

4. University personnel assumed the leadership role in a large majority of in-service events.

5. Summer workshops and teacher institute days were the most common formats for the delivery of in-service professional development.

6. Two-thirds of the institutions reported assuming some of the financial responsibility for in-service activities. Given declining funding of higher education in many states this could be a problem in the future.

7. The average in-service participant was between 31 and 40 years old, had between 5 to 12 years of teaching experience, had a Masters degree, and taught in the high school setting.

8. Approximately half of the institutions offered in-service sessions with no monetary or release time support of teachers who attend in-service professional development activities.

9. Little, or no, follow-up or evaluation of the outcomes of in-service activities is occurring.

Recommendations for Practice

The following recommendations are derived from this study:

1. The technology education profession should develop a publication which highlights and publicizes exceptional in-service and professional development activities. This would serve to promote and share effective in-service methods.

2. College and university personnel need to collaborate with other stakeholders in technology education to develop strategies to increase the involvement of technology education teachers in the planning, presentation, and evaluation of in-service activities.

3. In order for the technology education profession to receive the best value for scarce in-service resources, colleges and universities who offer activities must begin to implement a more effective means of evaluation and follow-up.

4. College and university professionals need to work in conjuction with other stakeholders to develop and implement strategies that encourage teachers to participate in in-service activities.

5. Providers of in-service programs need to continually seek ways to remove barriers to participation. For example, programs could be offered after school or on weekends and at nominal (or no) cost.

6. Given continual pressure on institutional budgets, colleges and universities need to find ways of funding in-service on a consistent basis independent of institutional monies.

Recommendations for Further Research

The purpose of this research was to describe the current state of in-service professional development and the degree to which those activities are focused on contemporary technology education. The findings of this study suggest a need to address the following questions:

1. What does a model in-service program look like? Case studies on specific states or regions may provide insights for the profession on what methods are effective and efficient.

2. What type of effective collaborations exist between university, state department, school districts, and professional organizations?

3. How effective is mandated in-service participation for meeting continuous certification requirements in moving a jurisdiction toward contemporary technology education?

4. Where do classroom teachers get their information on contemporary technology education and how do they perceive the effectiveness of the various in-service offerings available to them?

5. How does the type of in-service opportunities offered to technology education teachers compare to those for teachers in other academic disciplines?

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Appendix A

Survey Instrument

TECHNOLOGY EDUCATION
IN-SERVICE/PROFESSIONAL DEVELOPMENT
SURVEY

The purpose of this research is to determine the extent to which new technology education activities have been integrated into teacher in-service/professional development programs provided by colleges and universities.

NOTE: *For the purposes of this study in-service/professional development programs are defined as: 1-20 hour contact sessions or summer workshops that address topics in Technology Education.*

Directions: The following questions relate to your College or University's involvement in Technology Education in-service/ professional development activities in the past one year. Please check all responses that apply to or complete the question.

1. Is in-service required for continuous certification in your state?
   _____ yes _____ no

2. Is there a coordinated Program of Technology Education in-service workshops in your state?
   _____ yes _____ no
   If yes, who is the coordinating agency? _____
   _____

3. Does your college or university sponsor in-service or professional development activities for Technology Education teachers? _____ yes _____ no
   If no, please identify institutions in your area that do sponser programs. _____
   _____
   _____

4. How many in-service activities have been offered by your institution in the past year?
   ___ a. 1-3 ___ b. 4-6 ___ c. 7-9 ___ d. 10 or more

5. What is the focus of the in-service activities offered at your institution?
   _____ a. philosophy and rationale
   _____ b. teaching methods
   _____ c. curriculum development
   _____ d. student learning activities
   _____ e. technology update
   _____ f. curricular integration(i.e. math, science, tech.)
   _____ g. others, please specify - _____
   _____
   _____
   _____

6. Please identify specific topics covered in recent in-service programs.
   _____
   _____
   _____
   _____

7. How is in-service content determined?
   _____ a. state plan
   _____ b. conceptual framework
   _____ c. teacher input
   _____ d. workshop committee
   _____ e. University personnel
   _____ f. other, please specify - _____
   _____

8. Which methods have been used to present in-service(s) in the past year?
   _____ a. lecture
   _____ b. demonstration
   _____ c. small group activity
   _____ d. hands-on activity
   _____ e. seminar
   _____ f. other, please specify - _____
   _____

9. Who typically leads or presents the in-service(s)?
   _____ a. University personnel
   _____ b. classroom teacher
   _____ c. business/industry personnel
   _____ d. consultant
   _____ e. other, please specify - _____
   _____
   _____

10. Please check the type of in-service format used and whether or not it was offered for college credit.

FORMAT	CREDIT
_____ a. weekend	☐
_____ b. summer workshop or course	☐
_____ c. Teacher In-service/Institute Day	☐
_____ d. continuing education	☐
_____ e. after school workshop	☐
_____ f. other, please describe - _____	

11. How many teachers usually attend in-service programs?

_____ a. 01 - 10
_____ b. 11 - 20
_____ c. 21 - 30
_____ d. more than 30, please specify_____

12. What agency/institution was financially responsible for most in-service activities?

_____ a. College/University
_____ b. State Department of Education
_____ c. grant or project
_____ d. other State agency, specify -_____
_____ e. other, please specify -_____

13. If appropriate, please estimate the following demographic data for the typical in-service participant. (please complete each by checking appropriate box)

a. age
☐ 21-30, ☐ 31-40, ☐ 41-50, ☐ over 50

b. teaching experience in years
☐ 1-4, ☐ 5-8, ☐ 9-12, ☐ over 12

c. education level
☐ B.S., ☐ M.S., ☐ Ph.D.

d. type of school
☐ K-6, ☐ Middle/Jr.H ☐ High School

14. Based on observation or follow-up studies, how would you rate the impact of in-service programs?

_____ a. workshop content was implemented
_____ b. change was evident
_____ c. no change
_____ d. other, please specify - _____

16. Has data been gathered on the effectiveness of any of the in-service/professional development activities offered during the past year? _____ yes _____ no
If yes, please briefly discuss or attach the findings._____

17. In what ways are classroom teachers supported for attending in-service/professional development activities? (check all that apply)

TOPIC	WHO PAYS FOR THIS SUPPORT				
_____ a. release time	☐ School	☐ University	☐ State	☐ Grant	☐ Other _____
_____ b. travel expenses	☐ School	☐ University	☐ State	☐ Grant	☐ Other _____
_____ c. paid substitutes	☐ School	☐ University	☐ State	☐ Grant	☐ Other _____
_____ d. no support					
_____ e. other, please specify - _____					

18. Additional Comments:_____

Please return to : *Drs. Richard Boser & Michael Daugherty - 210 Turner Hall*
Illinois State University

Appendix B

Institutions in Survey Population

Ball State University, IN
Bemidje State University, MN
Bowling Green State University, OH
Brigham Young University, UT
California State Univ. Long Beach
California Univ. of Pennsylvania
Central Washington University
Central Michigan University
Chadron State College, NE
Clemson University, SC
Colorado State Univ
Eastern Kentucky
Fitchburg State College, MA
George Mason University, VA
Indiana University of Pennsylvania
Iowa State University
Kearney State College, NE
Keene State College, NH
Mankato State University, MN
Millersville Univ. of Pennsylvania
Montana State University
Montclair State College, NJ
Moorhead State University, MN
Norfolk State University, VA
North Carolina State University
Northern Montana College
Old Dominion University, VA
Oregon State University
Purdue University, IN
Sam Houston State University, TX
Southeastern Oklahoma State Univ.
Southern Utah University
Southwestern Oklahoma State Univ.
St Cloud State University, MN
State Univ. College at Buffalo, NY
The University of Tennessee
The Ohio State University
The City College of New York
Trenton State College, NJ
University of Wisconsin-Stout
University of Northern Iowa
University of Houston, TX
University of Arkansas
University of Nebraska
University of Southern Colorado
University of Minnesota
University of Idaho
Utah State University
Virginia Technical University
Western State College, CO

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n = 50

Source:

Householder, D. L. (1992). *The supply of Technology Teachers in 1991 and 1992.* Paper presentation at ITEA Minneapolis, MN.

Appendix C

Respondent's Comments on Technology Education In-service Survey

Numbers correspond to questionnaire items (See Appendix A).

1. Is in-service required for continuous certification in your state?

   It is one of many routes that teachers can earn recertification points.

   Do not need continuing education type of in-service programs for continuous certification.

6. Specific topics covered in recent in-service programs (n=74). Number in parathesis following the item indicates the number of time the activity was mentioned.

action labs (2)
applied mathematics and physics
CAD (4)
CAD/CAM
CAI in electronics
CNC (3)

communication technology (2)
communication software programs

computer applications i.e. Pagemaker, Hypercard
computer integration
computer operation
computer graphics
computer repair
computer controller interface
computer virus removal

contemporary learning activities in Technology Education
curriculum development (2)

design brief development
desktop publishing (3)
development of a new State curriculum guide

education workshops
electronics update
elementary Technology Education (2)

facilities remodeling (2)

identifying learner outcomes
implementing Technology Education modules (2)
integrated academics (2)

manufacturing technology
manufacturing materials and process technology
manufacturing simulation

Middle School Technology Education curriculum, programs, & activities (2)
MST integration (2)

outcome based Technology Education

pneumatics/hydraulics (2)
Principles of Engineering (high school)
Principles of Technology (6)
problem solving (2)
program development

robotics (7)

society/ethics/technology
special needs

technology core
trends & issues in Technology Education
using LEGO educational products

7. How is in-service content determined?

   University faculty members in collaboration with school district administrators and teachers determine in-service content.

   District teacher meeting.

   Grant based programs.

   Where we can get the greatest number of students.

8. Other methods used to present in-service(s) in the past year included: (a) simulations, and (b) experimentation.

9. Who typically leads or presents the in-service?

   Representatives from various area of education ie. teachers, superintendents, etc.

   State Education Department personnel.

   University personal with a graduate student

10. Additional types of in-service formats included: (a) teacher working days, (b) consultation sessions, (c) full-day conference, (d) local association meetings, (e) graduate courses, and (f) mini-state conference.

11. How many teachers usually attend in-service programs?

    48 teachers at last in-service.

    Varies with content, format, etc., however, average attendance is about 20 teachers.

    150 teachers at a district-wide institute day.

14. Based on observation or follow-up studies, how would you rate the impact of in-service programs?

    Where contact is maintained over time the greatest change is realized. Cooperating teachers are recruited and encouraged to continue involvement in in-service program.

14. continued . . .

Great interaction and professional bonding among participants. Rejuvenation!

Most change requires long term contact

Outcomes are uneven and largely related to the intentions of the participants.

16. Has data been gathered on the effectiveness of any of the in-service professional development activities offered during the past year?

Evaluation by continuing education office for each course.

Evaluation at end of each workshop taken.

Each year our workshops series has been in greater demand.

Questionnaires are filled out following the in-service an its effectiveness evaluated.

We do follow-up on credit courses. Faculty also have groups evaluate the use of material presented.

Both formative and summative data were collected as new endeavors have been developed. So far this year we have not implemented any new efforts.

Follow-up both written and by observation on-site.

All participants must submit follow-up report of changes during Fall in order to receive credit for workshops taken the previous summer.

Application session in which the teachers prepare curriculum and instruction materials for their classroom/laboratories are the most successful.

17. In what ways are classroom teachers supported for attending in-service activities?

Most workshop participants are reimbursed for tuition by their school districts.

Most teachers get reimbursed.

Some districts offer financial support, but it is rare.

Companies provide teachers with manuals (e.g. AUTOCAD).

17. continued . . .

Cooperating teachers receive fee waivers as a result of our undergraduates being placed in the schools for field experience.

State pays tuition, board, and room for summer workshops/courses through State's allocation of Carl Perkins funds.

Recertification points awarded to teachers for attending professional development activities.

University fees paid by State Department.

Tuition for grad courses is sometimes picked up or shared by teachers school.

18. Additional Comments:

Unless enrolled in a grad program all teachers want is something they can use in the classroom.

As you can see, we run an extensive in-service program for the state and region. Our staff also do many in-service programs for school districts. We have an extensive "Center for Technology Education Resource Room" that is used throughout the year. I have enclosed some samples of promotions we generate (where are these??).

We are currently looking into expanding our offerings, both formally as grad classes and as workshops. Our limiting constraints here are due to contractual problems regarding faculty load/compensation, summer school course slots available, minimum course sizes, etc.

Our summer institute is the best single effort to facilitate the technology education movement. Tech. ed. would still be industrial arts without this program. (NH)

Teachers in PA need 24 semester hours of courses for permanent certification and then 6 semester hours every five years to maintain their certification. Also, most teachers are able to advance on the pay scales by completing course and workshops. Each workshop has a minimum of 37.5 contact hours.

State Education Department has supported workshops. This past year individual teachers had to support their own expenses, although a small stipend was sometimes included for participants.

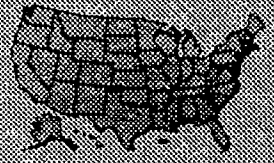
Appendix D

Example of Teacher's Conference Program

BALL STATE UNIVERSITY
Department of Industry and Technology
1992 FALL CONFERENCE PROGRAM

Time	Event	Presenter	Location
9:00 - 9:30 a.m.	Registration	PA Hall	
9:30 - 10:00 a.m.	General Session		
	Teachers/Administrators	T. Wright	PA 215
	Students	J. Wescott	PA 210
10:15-11:30 a.m.	Teacher Sessions		
	Electronic Media and Systems	R. Seymour	PA 207
	Innovative Construction Activities	J. Wescott	PA 136
	Activities in Material Testing	R. Shackelford	PA 144
	Technology Education–The 1995 Program	T. Wright	PA 215
	Administrator/Guidance Personnel Sessions		
	TECH PREP in Indiana	R. Henak	PA 214
	Student Sessions		
	Video still photography	T. Tomlinson	PA 140
	Computer-aided drafting	R. South	PA 130
	Emerging technology of magnetic levitation	M. Evans	PA 143
	High-tech manufacturing	A. Leduc	PA 216
	Consider a "technology" career	D. Smith	PA 139
	Processing and testing plastics	J. Wickman	PA 134
11:30-12:15	Lunch		
12:15-1:30 p.m.	Teacher/Administrator/Guidance Personnel Sessions		
	Environmental Issues in the Tech Ed	C. McLaughlin	PA 210
	Technology Educ: An Australian Perspective	P. Benzie	PA 139
	The TECH Team	W. Baldwin	PA 207
	Conducting Technology-related Contests	T. Wright	PA 215
	Innovative Construction Activities	J. Wescott	PA 136
	Activities in Material Testing	R. Shackelford	PA 144
	Teaching Product Design	J. Diebley	PA 133
	TECH PREP in Indiana	R. Henak	PA 214
	Student Sessions		
	Computer-aided drafting	R. South	PA 130
	Emerging technology of magnetic levitation	M. Evans	PA 143
	High-tech manufacturing	A. Leduc	PA 216
	Consider a "technology" career	D. Smith	PA 139
	Processing and testing plastics	J. Wickman	PA 134
1:45-3:00 p.m.	Teacher Sessions		
	Environmental Issues in the Tech Ed	C. McLaughlin	PA 210
	Innovative Construction Activities	J. Wescott	PA 136
	Teaching Product Design	J. Diebley	PA 133
	TECH PREP in Indiana	R. Henak	PA 214
	Administrator/Guidance Personnel Sessions		
	Technology Education–The 1995 Program	T. Wright	PA 215
	Student Sessions		
	Video still photography	T. Tomlinson	PA 140
	Computer-aided drafting	R. South	PA 130
	Emerging technology of magnetic levitation	M. Evans	PA 143
	High-tech manufacturing	A. Leduc	PA 216
	Solids modeling	W. Baldwin	PA 208

RESULTS OF NATIONAL SURVEY



Dr Michael Daugherty
Dr Richard Boser

ILLINOIS STATE UNIVERSITY

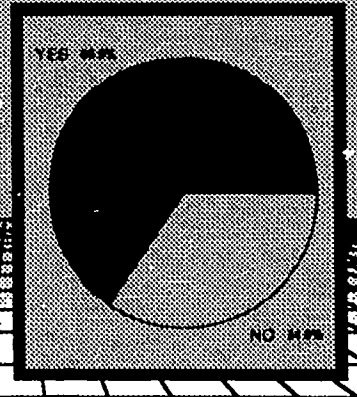
The Role of Colleges and Universities in Providing In-Service Programs for Technology Education

SURVEY OVERVIEW

- 22 STATES INCLUDED
- 50 INSTITUTIONS SURVEYED
- 29 RESPONDED WITH IN-SERVICE PROGRAM
- 3 RESPONDED WITH NO IN-SERVICE PROGRAMS

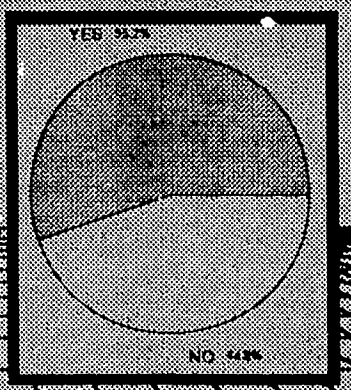
Is in-service required for continuous certification in your state?

YES	19	66%
NO	10	34%



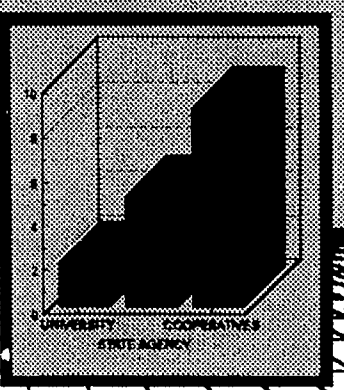
Is there a coordinated Program of Technology Education In-service workshops in your state?

YES	16	55%
NO	13	45%



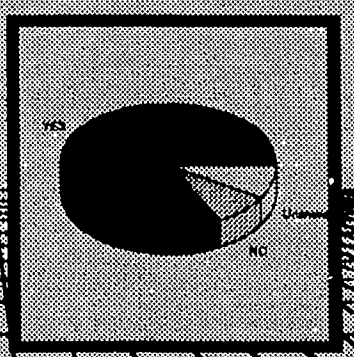
Who is the workshop coordinating agency?

Cooperatives	9
State Agencies	5
Universities	2



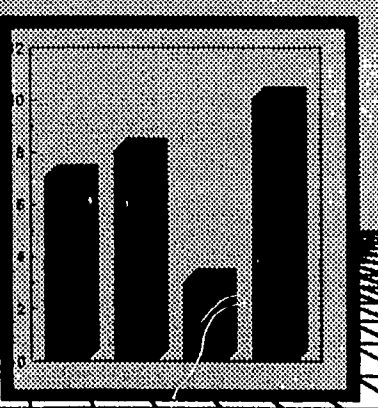
Does your college or university sponsor in-service or professional development activities?

YES	29
NO	3
Unanswered	3



How many in-service activities have been offered by your institution in the past year?

1-3	7
4-6	8
7-9	3
10 or more	10



What is the focus of in-service activities offered at your institution?

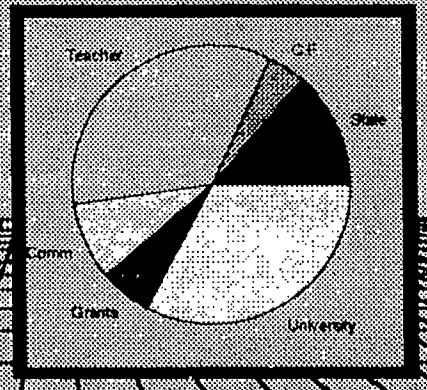
- Technology update 25
- Curriculum development 24
- Student learning activities 19
- Teaching methods 18
- Curriculum integration 15
- Philosophy
- Other classroom research 1

Please identify specific topics use in recent in-service programs.

- Principles of Technology
- Special needs
- Computer integration
- CAD
- Modular education
- Computer interfaces
- Voice controls
- Total quality mgmt
- Pneumatics
- Hydraulics
- Mechanics
- Virus protection
- Computer repairs
- Communication software

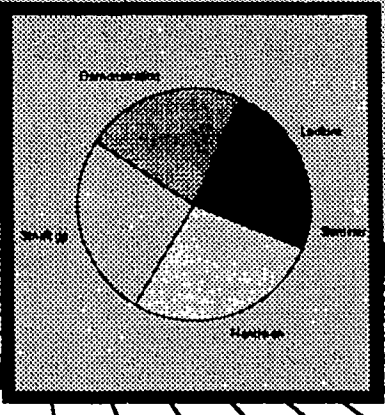
How is in-service content determined?

- Teacher input 23
- University staff 22
- State plan 9
- Workshop committee 6
- Conceptual framework 3



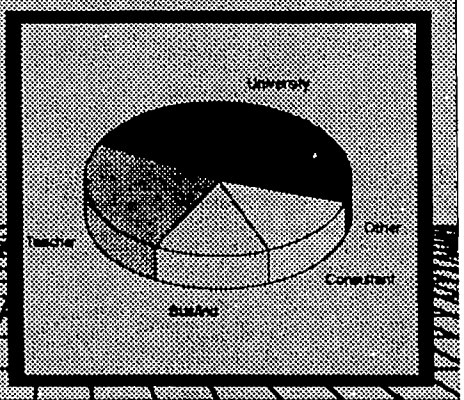
Which methods have been used to present in-service(s) in the past year?

- Hands-on activity 27
- Small group activity 25
- Demonstration 22
- Lecture 18
- Technical



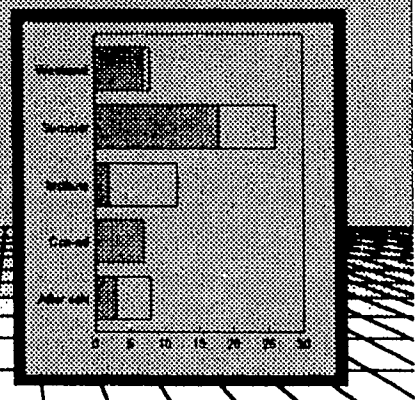
Who typically leads or Presents the in-service(s)?

- University personnel 27
- Classroom teacher 16
- Business/industry personnel 9
- [illegible]
- Other 3



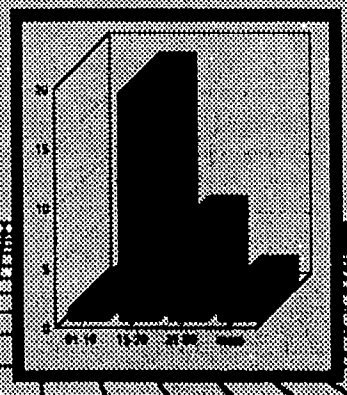
What type of in-service format was used and whether or not it was offered for college credit.

- Summer school 27
- Teacher in-service or Institute day 14
- After school 9
- Weekend 8
- Continuing
- Other 5
  - Spring conferences
  - Association meeting
  - Consultations
  - Occupational expr.
  - Individual studies



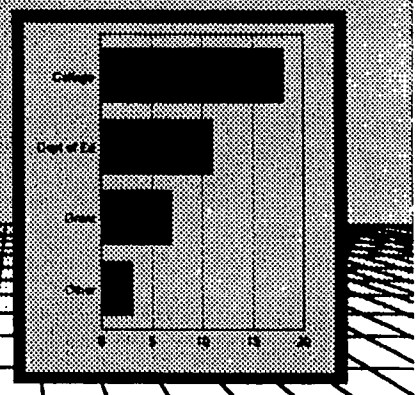
How many teachers usually attend in-service programs?

- 01-10 1
- 11-20 19
- 21-30 7
- > 30 2



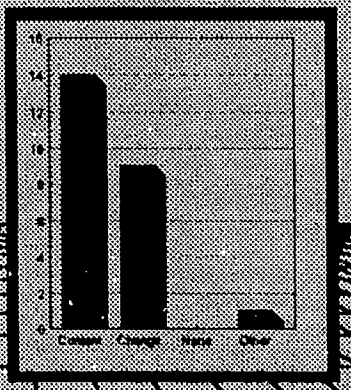
What agency / institution was financially responsible for most in-service activities?

- College/Univ. 19
- State Dept of Ed 12
- Grant or project 7
- Other 3
  - TechEd Association



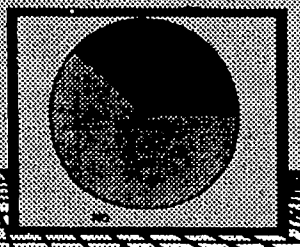
Based on observation or follow-up studies, how would you rate the impact of in-service programs?

- Content was implemented 14
- Change was evident 9
- [illegible]
- [illegible]



Has data been gathered on the effectiveness of any in-service / professional activities offered during the past year?

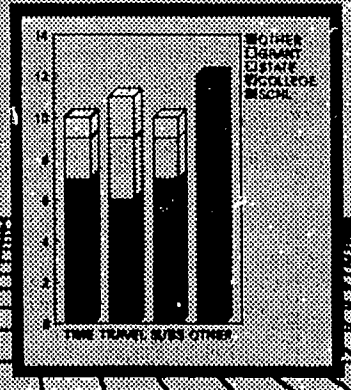
- YES 11 28%
- NO 18 62%



We use class follow-up sheets.
We use questionnaires to teachers.
The Continuing Education office does his.

In what ways are classroom teachers supported for attending in-service / professional development activities?

- Release time 13
- Travel expenses 14
- Paid substitutes 12
- No support 14



We would like to thank The Council on Technology Teacher Education for sponsoring this study.