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ABSTRACT

A study identified and ranked those factors which facilitate and those which impede the linkage between technology education and tech prep. The top four states with regard to integration of technology education and tech prep were Illinois, South Carolina, Oregon, and Idaho. Factors that facilitated integration were as follows: technology education's emphasis on problem solving and critical thinking skills; support from the legislature, school administration, and professional associations; concentration on hands-on learning methodology; changing attitudes of staff and administration; teacher incentives; articulation agreements between secondary and postsecondary levels; a valid tech prep curriculum with a required technology education component; and up-to-date computers. Some of the factors which impeded integration of technology education and tech prep are: stigma of "shop"; teachers' resistance to change; turfism; unawareness of what technology education is; lack of understanding of how technology fits into the curriculum; improperly trained new teachers; and lack of time, training, and financial support. Only 18 percent of technology education teachers were actively working to integrate technology education into tech prep. The two areas from which most of the lack of cooperation and involvement stem were lack of communication and resistance to change. Three sets of recommendations were developed, based on facilitating factors, impeding factors, and general recommendations for integration. (YLB)

Integrating Technology Education and Tech Prep

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Technology education and tech prep are both new initiatives which are gaining the attention of many in all areas of education. "Tech prep has been called the most exciting initiative to hit the educational world in decades"(Hull & Parnell, 1991). In a report by Boyer (1983), it was recommended that all students study technology. Although there is a natural association between tech prep and technology education, only three articles have been published in *The Technology Teacher* addressing this relationship (Betts, Welsh & Ryerson, 1992; Lewis, 1992; Roberts & Clark, 1994). Colelli (1993), in a presentation at the International Technology Education Association (ITEA) conference, presented these six elements which could be provided by tech prep if technology educators were to get involved:

1. A balanced technical core. (focus on SCANS)
2. A powerful catalyst for curricular change.
3. A viable solution to the curricular squeeze in teacher education programs across the nation.
4. An excellent recruitment tool for technology teacher education programs.
5. A window of opportunity to reverse the trend toward extinction of technology education.
6. An opportunity to make a meaningful contribution in the battle for economic competitiveness.

Statement of the Problem

A quality work force is indispensable to the prosperity of our nation. Tech prep has evolved as tool to ensure a quality work force. Technology education has had a very limited role in the tech prep initiative. In order for tech prep to reach its full potential, technology education must be included. Through this study, factors which facilitate or impede the linkage of technology education to tech prep will be identified and ranked.

Purpose of the Study

The purpose of this study was to identify and rank those factors which facilitate and those factors which impede the linkage between technology education and tech prep. This information can be used in designing and developing new programs and in making improvements to existing programs.

Operational Objectives

The five basic operational objectives necessary to the completion of this study were to:

1. Review and summarize the relevant research in the implementation of tech prep programs with regard to the relationship between technology education and tech prep.

2. Identify the top states with regard to their linkage of technology education to tech prep.

3. Identify the panel of experts from the previously identified top states.

4. Survey panelists to identify the factors that facilitate or impede the implementation of a tech prep program which integrates technology education into the plan.

5. Rank the facilitating/impeding factors necessary to implement a tech prep program based upon the responses of the panel of experts .

Assumptions

This investigation was based upon the following assumptions:

1. Technology education is an important component for the successful implementation of a tech prep program.

2. State supervisors of technology education, presidents of ITEA affiliated state associations, state coordinators of tech prep and coordinators of technology teacher education programs were capable of rating their states' percentage of technology education teachers who are involved in the implementation of tech prep.

3. The previously mentioned group were capable of rating the technology education teachers level of involvement.

4. The representatives of the top states nominated panelist who are experts in the integration of technology education and tech prep.

Limitations

There are several limitations which are inherent to studies which utilize a mailed questionnaire. Since a 100 percent response rate is nearly impossible, how do the nonrespondents effect the results of a questionnaire? "A common sampling bias of this type is that persons having a good program are more likely to respond than those having a poor program" (Borg & Gall, 1989, p. 443). Since this study is seeking to identify top states, the statement by Borg and Gall would lead to the conclusion that the those nonrespondents come from states with poor programs and would therefore not effect the outcome of this study.

The organizational structures of state departments of education differ greatly from state to state. The results are generalizable to the extent that the organizations in the top states resemble the organizations in the other states.

Delimitation

The data gathering was restricted to a minimum of three and a maximum of five states based upon the natural break of data from the national overview. A natural break occurred in the data after the fourth state, therefore only the top four states were represented on the panel of experts. All states which have an affiliated ITEA state organization were included in this study. Hawaii and Nevada are the only two states which do not have an affiliated ITEA state organization.

Summary

Five basic operational objectives were necessary for the completion of this study. The summary section will arranged around these operational objectives.

1. **Review and summarize the relevant research in the implementation of tech prep programs with regard to the relationship between technology education and tech prep.** The question of educational excellence has caused a great deal of controversy in America. A review of the research revealed that there is a downward trend in educational excellence. Factors such as drop-out rates, the traditional general education track, and curriculum which lacks any true ties to the real world contribute to this downward spiral. Tech prep addresses many of the problems of education today. A carefully developed tech prep program will provide students with a strong academic foundation as well as preparing them for their chosen career path.

There are three concerns in technology education today which have technology educators looking for solutions. These concerns are:

1. The inclusion of technology education as an imperative area of study
2. Declining enrollment in technology classes due to the increased requirements for graduation
3. Declining numbers of students entering technology teacher education programs.

Many tech prep programs include technology education as a required class which will directly effect the first two concerns of technology education and as the first two increase, the demand for technology education teachers should result in increased enrollment in technology teacher education programs.

A review of the research revealed that a tech prep core which is built around technology education allows tech prep to reach its full potential. The most important factor is still the student and the bottom line is that a tech prep program which integrates technology education, not only is beneficial to technology education and tech prep, but more importantly, the student wins also.

The purpose of this study was to identify and rank those factors which facilitate and those factors which impede the linkage between technology education and tech prep. This information can be used in design, implementation and evaluation of tech prep programs.

2. **Identify the top states with regard to their linkage of technology education to tech prep.** The top four states were identified though the use of a nationwide questionnaire which was sent to the following representatives in each state: (a) International Technology Education Association (ITEA) affiliate representative, (b) supervisor of technology education or equivalent, (c) coordinator of technology education or the head of the department of the university, which graduated the most technology education (teachers) majors, and (d) state coordinator of tech prep.

3. **Identify the panel of experts from the previously identified top states.** The representatives of the top states were asked to nominate persons from their state who were involved in the integration of technology education and tech prep. Representatives were asked to nominate persons from each of the following categories: (a) Tech Prep Consortium Coordinator, (b) Technology Education Teacher Educator, (c) District Level Technology Education or Vocational Supervisor, and (d) Secondary Technology

Education Teacher. The person receiving the most nominations was invited to serve as a member of the panel of experts.

4. **Survey panelists to identify the factors that facilitate or impede the implementation of a tech prep program which integrates technology education into the plan.** The panel members were asked to list the factors which they felt facilitated the integration of technology education and tech prep. The members were then asked to list the factors which they felt impeded the integration of technology education and tech prep.

5. **Rank the facilitating/impeding factors necessary to implement a tech prep program which integrated technology education based upon the panel of experts responses.** The list of factors was synthesized and duplicate responses deleted to produce the final list of factors. The panel members were sent the final list of factors and asked to rate each, on its level of importance, on a ten point scale. Panel members were also asked to list and rate any additional factors which they felt may have been missed. The mean and the standard deviation were calculated for each factor and they were then arranged in ranked order.

Summary of the Results

The top four states, with regard to the integration of technology education and tech prep, as identified in this study were: Illinois, South Carolina, Oregon, and Idaho. A ranked listing of the top ten factors which facilitate the integration of technology education and tech prep are listed below.

1. Technology education stresses problem solving and critical thinking skills.

2. Support from the Legislature, School Administration (all levels) and Professional Associations (ITEA, AVA ...)

3. Emphasis is placed in our [technology education] programs on students being able to perform tasks and on learning "how" and "why" of these tasks. A concentration on "hands-on" learning methodology.

4. Changing attitudes of staff and administration to value the importance of technology and its link to the application of academics.

5. Teacher incentives such as training, planning time, compensation, etc.

6. Articulation agreements between secondary and post-secondary levels.

7. Providing technology education teachers with a valid model tech prep curriculum that includes a required technology education component.

8. The design of a tech prep technical core that emphasizes technological literacy as well as generic technical competencies common to all engineering related careers.

9. The importance of technology education, in programs addressed by tech prep.

10. Up-to-date computers with essential programs for manufacturing, electronics, math, communications, etc.

A ranked listing of the top ten factors which impede the integration of technology education and tech prep are listed below.

1. The stigma of "shop" by students , parents, peers, and taxpayers.

2. Reluctance of some teachers to change their curriculum to meet current needs. Subject teaching "security" is lost and some teachers will feel vulnerable to change.

3. Turfism - unwillingness to accept and work with teachers from different departments, disciplines, and levels of education.

4. An unawareness of what technology education is by not only students and parent.. but school board members, fellow faculty members, guidance counselors and taxpayers

5. Lack of understanding of how technology fits in to curriculum.

6. School administration and faculty belief that tech prep is vocational, not college prep.

7. An unawareness of what tech prep is by not only students and parents. but school board members, fellow faculty members, guidance counselors and taxpayers.

8. No incentives for teachers to plan - planning is seen as "one more thing" without any additional funding or other form of compensation.

9. New teachers are not properly trained.

10. Lack of time, training, and financial support.

Conclusions

The data collected from this study indicated that technology education teachers are not very involved in the implementation of tech prep. Only 18 percent of the technology education teachers are actively working to integrate technology education into tech prep, and in many cases this is a result of an administrative mandate. Technology education plays a very important role in the successful implementation of a tech prep program, as a result of the curriculum and the methodology with which it is presented in the classroom.

There appear to be two areas from which most of the lack of cooperation and involvement stem. First is the lack of communication and second is the resistance to change among the people involved. The resistance to change results not only from teachers guarding their turf, but also from the fact that a large number of technology education teachers are nearing retirement and are not willing to change at this late date.

Discussion

The role of technology education in tech prep cannot be concluded from this study, however, several insights into this role have emerged. The contributions that technology education makes to a successful tech prep program include:

1. The applied methodology which is utilized in the teaching of technology education makes for a natural fit in tech prep programs.

2. The exposure to technical careers through technology education provides a strong foundation for career decision making within tech prep.

3. The incorporation of SCANS competencies into technology education classes produces students with the skills necessary to excel in today's society.

4. Technical literacy which is taught through technology education is very important in many programs addressed by tech prep.

There are also several ways in which a tech prep program can contribute to a successful technology education program. These include:

1. Tech prep will enhance the integration of technology education and other courses.

2. Tech prep may bring additional resources into the technology education lab in the form of additional equipment as well as updated curriculum and teaching methods.

3. Enrollment in technology education courses should increase if it is required for graduation as a part of a tech prep program.

Recommendations

The recommendations have been organized into the following three subsections:

1. Recommendations based upon facilitating factors
2. Recommendations based upon impeding factors
3. General recommendations for integration

The following recommendations are based upon the collection and evaluation of the data gathered for this study. In order to ensure the integration of technology education into a tech prep program, the following program considerations are recommended.

Recommendations Based Upon Facilitating Factors

1. Members of the panel of experts emphasized that administrators must not only support the tech prep initiative, but also take an active role in the implementation.
2. The technology education curriculum should emphasize technological literacy which will provide a strong core for tech prep.
3. Exposure to technical careers through technology education should be encouraged for career decision making within tech prep.

Recommendations Based Upon Impeding Factors

1. There is a reluctance on the part of some technology education teachers to change their curriculum to meet the current needs of students. These teachers often feel that if there is not an enrollment problem or that if the administration is not concerned, then no problem exists. This problem must be addressed before a technology education program will be considered for inclusion into a tech prep program.
2. Technology educators must do a better job of educating administrators, parents, and counselors about the "new" technology education curriculum. The "shop" perception is still ingrained in the minds of many and technology educators must break that paradigm in order for integration to take place.

General Recommendations for Integration

1. Technology educators must be involved and actively looking for opportunities for the integration of technology education and tech prep.
2. Participation in professional associations such as ITEA and AVA should be encouraged for technology education teachers in order to provide insight into the profession.
3. Professional associations, such as ITEA and AVA must lead in the integration tech prep. Sitting back and watching will only lead to a missed opportunity for technology education to gain the status associated with being a part of the core curriculum.

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