SUCCESSFUL STRATEGIES FOR EDUCATING STUDENTS WITH DISABILITIES IN TECHNOLOGY EDUCATION

Elinor Foster-Blackwell
North Carolina A & T State University
elinorb@ncat.edu

Abstract

A study was conducted to determine how well technology education teachers feel they educate students with disabling conditions. The participants were asked to rank the teaching strategies which led to success for students with disabilities enrolled in technology education classes. The need for the study to provide information on the technologically advanced society and the roles of its inhabitants; however, technology education also includes a wealth of information relative to general education which could facilitate learning in other disciplines. The practical activities students complete in technology education require students to apply interdisciplinary facts and principles in order to produce effective solutions to problems. The methodology used was a survey instrument which gathered data from high school technology education teachers in North Carolina. The results of the study revealed technology education effectively or very effectively contributes to successful student outcomes relative to actual technology education curriculum.

Introduction

Technology education is an action-based course of study which is designed to prepare technologically literate students to make informed decisions as productive members of a global society. Technology education has been defined as a program of instruction which provides students with a broad knowledge and equips them to effectively apply technologies in daily life [7]. The word technology is derived from the Greek word, techne, which means to make, and translates literally as art or craft [6]. The present day usage of the term technology refers to any entity which extends human ability to accomplish set goals. This study focuses on technology education at the high school level due to the more in-depth degree to which the curriculum helps prepare students for the real-world problems they will face as adults.

Discussion

Technology education teachers acquired recognition by some for providing students with a practical approach to presenting course materials that could enhance student learning.

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One such example of the practicality of technology education could be seen during the early stages of mainstreaming when industrial arts students with disabilities were assessed. The technology education teachers of that era were actively looking for ways to place the students, who could manage the work, into regular classes.

One educator who was looking for ways to help industrial arts (technology education) teachers respond appropriately to the challenges associated with educating students with disabilities, a case study was conducted in 1979 which revealed that students with emotional disabilities were greater challenges to teachers than students with other types of disabilities [5]. An example of the challenges these students could present is illustrated by one emotionally disabled student who had been expelled from different schools for inappropriate behavior. This student was allowed in the industrial arts shop as a reward for appropriate behavior. The hands-on activities that this student was involved in seemed to lessen his emotional outbursts. This program educated a number of other students with disabilities. This program allowed these students to participate in the class to the best of his or her ability. This industrial arts teacher was actively involved in modifying the environment to accommodate students with disabilities. This teacher even involved other eager student participants in the problem solving venture for facility modification. This teacher found students with disabilities were no better or worse than regular students relative to their ability, or willingness to utilize tools appropriately [5]. Other studies later confirmed the apparent educational benefits students garnered from the industrial arts hands-on approach to learning. One example of these studies could be seen when Wenig conducted a study in 1978. Wenig stated that the multi-sensory manipulative experience garnered from industrial arts programs may provide a missing link in helping children, specifically learning disabled students, remediate their educational problems [9]. This study implied that educators were attempting to combine proven strategies with experimental new approaches aimed at improving student performance.

One example of these educational innovators was Kozak [4]. He stated that the letter and the intent of disability legislation could be satisfied by providing each student, regardless of disability status, with an Individual Education Plan (IEP). He recommended that an individualized assessment be performed for each student and an IEP be developed based on industrial arts goals for all students. He felt that this approach to IEP development could improve the educational success for all students enrolled in industrial arts classes [4]. The prospect of providing each student with an IEP sounded ideal; however, the vocational education teachers who would be faced with executing this additional task may not have been enthusiastic about this prospect.

A more realistic approach to providing students with an appropriate education, was illustrated in a program reported by Joyce and McFadden in 1982. This program stressed a collaborative effort linking special education to industrial arts. This team approach could help to provide students with disabilities the independent living skills needed to live self-sufficient lives. This program was based on typical industrial arts course work, which included woodworking tools, and basic measurement concepts [3]. Another typical teaching tool used in industrial arts was the problem solving model. Industrial arts (technology education) teachers relied heavily upon these problem solving techniques as a means for helping students to become analytical thinkers. It should come as no surprise that some of the same strategies instilled in students for solving real-world problems could be applied to the problems which persisted regarding inclusion.

A group of educators wrote a research article on how they approached mainstreaming by using a problem solving model [1]. They brainstormed possible solutions then gathered data. These educators then conducted a literature review on instructional strategies for special education students in regular vocational education programs. The purpose of this paper was to present four generic instructional strategies which they found vocational instructors used effectively relative to students with disabilities. Examples of these strategies included collaborative approaches to teaching, which combined knowledge, expertise, and resources from diverse individuals or agencies in a common effort to provide successful vocational education learning experiences for students with disabilities. Another strategy they recommended was to use cooperative learning groups, or systematic models for helping teachers instruct students. This includes having students working in groups in order to learn the subject matter and skills like cooperation, collective problem solving, positive interdependence, individual accountability, and scheduling. Harris stated modular technology education labs provide students the opportunity to work on practical problem-based projects in a manner that is self-directed. These modular technology education laboratories incorporate instructional books, multimedia presentations as well as direct teacher instruction. A variety of subjects can be covered via the modular approach which allows students to migrate between modules as they learn different subjects at each module. Consequently, students can learn the information at various times throughout the course requiring no two students to work on the same module at the same time [2].

A third strategy recommended by Green, Albright and Kokaska (1989) was task analysis, or breaking down a task into increasingly specific sub-skills or parts so students clearly understood requirements to complete a vocational activity. Other recommendations included tutoring, (adult or peer), using individuals other than teachers who were assigned to help students with disabilities to improve academically. The authors pointed out that most of the research had been done in special and regular education settings, not in vocational education. Additional investigations were needed to better understand when and how these strategies should be implemented. These findings concurred with research which reaffirmed that vocational educators were in need of more information, training and assistance in order to properly use instructional strategies that fully integrated students with disabilities [1]. The results from this study revealed some of the more successful mainstreaming strategies incorporated into vocational education classes at this time. These strategies could possibly have been even more successful if they had been consistently coupled with collaborative efforts to help students with disabilities.

A study by Stodden, Meehan, Bisconer and Hodell (1989) revealed a gap which existed between successful educational strategies and the groups of educators charged to improve educational outcomes for students with disabilities. Their 1989 research study was conducted to facilitate the vocational preparation of secondary students with disabilities. This study used a random convenience sample of 127 students with mild to severe disabilities. All assessment instruments administered to subjects were either obtained from the schools or from a central vocational assessment center. The assessment instrument and IEP was examined for each student to determine if any of 28 Life-Centered Career Education (LCCE) competencies had been measured. The first analysis revealed that 40% of students had no vocational goals or objectives on the IEP prior to vocational assessment. The second analysis examined if the IEP content of vocational goals and objectives were related to content of vocational assessment information. The findings indicated only about 50% of the IEPs were grounded in information collected through vocational assessment. The third analysis examined whether the number of vocational goals varied based on the level of student disability. These findings from this study which was designed to address the use of vocational assessment information in the IEP development process, led the researchers to conclude that in many cases IEP vocational goals and objectives were apparently written without using vocational assessment information [8].

Studies such as the previously mentioned one, presented an array of problems related to educating students with disabilities needs in regular classes continued to unfold. These problems gave vocational teachers an opportunity to use some of the problem solving skills they espoused to students.

Methodology

Surveys were mailed to each of the 323 technology education teachers in North Carolina. There were a total number of 97 usable surveys or 30% of the entire universe of technology education teachers in North Carolina. These survey instruments were used to gather information from respondents. The first category was demographic background. The second category of information gathered from this survey included material regarding technology education teacher perceptions, practices, preferences and opinions of technology education phenomena as they relate to students with disabilities. The results for this survey were tabulated and frequency data was collected and ranked according to mean in tables. The significant manova and anova data was also tabulated. The survey items analyzed and the results were tabulated. The survey questions required a response on a four point likert scale, which ranged from: Not effective (1) to very effective (4).

Findings

The survey questioned teachers opinions for the most effective types of delivery systems used in TED classes. The types of delivery systems were: Games and simulations, Cooperative groups, discovery (inquiry, experiments), and formal presentations. These types of delivery systems were ranked by means greatest to lowest in effectiveness for educating students with disabilities (games and simulation ranked first). Secondly, the informants ranked cooperative groups as the preferred delivery system for TED. The least effective method for educating students with disabilities was reportedly formal presentations and demonstrations. The bivariate evaluation of this item yielded no significant results. The multivariate analysis of this item revealed no significant difference between majors. The frequency data illustrates the preferences of each group of teachers are listed in Table 1. The most effective means for educating these students was found to be Games and simulations with 26.8% of respondents selecting this option. The second most effective method of education was considered to be cooperative groups with 22.6% selecting this option. The least effective educational method was considered to be direct instruction with 18.5% of respondents selecting this option.

TABLE 1: *Frequency Table for TED Delivery Systems*

Ranking (Item #)	Stem	major	Mean	Responses					
				Not Effective (1)	Slightly Effective (2)	Effective (3)	Very Effective (4)	NA	Total
1(10d)	Games/simulations	TED	3.04	0 0.0%	4 4.1%	26 26.8%	15 15.4%	3 3.0%	48 49.48%
		Non TED	2.73	3 3.0%	6 6.1%	25 25.7%	11 11.3%	4 4.1%	49 50.52%
2(10b)	Cooperative groups	TED	3.00	0 0.0%	7 7.2%	22 22.6%	16 16.4%	3 3.0%	48 49.48%
		Non TED	2.67	1 1.0%	14 14.4%	23 23.7%	7 7.2%	1 1.0%	49 50.52%
3(10c)	Discovery, inquiry, Experiments	TED	2.97	2 2.0%	3 3.0%	25 25.7%	15 15.4%	3 3.0%	48 49.48%
		Non TED	2.79	4 4.1%	5 5.1%	5 5.1%	12 12.3%	3 3.0%	49 50.52%
4(10a)	Formal presentations	TED	2.35	4 4.1%	19 19.5%	18 18.5%	3 3.0%	3 3.0%	48 49.48%
		Non TED	2.20	6 6.1%	22 22.6%	14 14.4%	4 4.1%	3 3.0%	49 50.52%

The statistical test used for multivariate analysis of variance for this study was Wilks' lambda. The means of the two groups of teachers were compared to determine if there were significant differences. A large value would have indicated that there was a difference between the two groups; however, there was no indication of significant differences between group means. The Wilks' Lambda values are presented in Table 2.

TABLE 2: *Manova Table for TED Delivery Systems*

Statistic	Value	F Value	Df	*Pr > F*
Wilks' Lambda	0.96422787	0.85	4	0.4952

Conclusions

Technology education incorporates information which correlates with a many other disciplines. Effective utilization of successful teaching strategies can enhance student outcomes. The most effective teaching strategy for technology education teachers was described as games and simulation. The least effective method was considered to be direct instruction. Understanding this curriculum can better prepare students to find success in a technologically advanced society. The students mastering these abilities could be better prepared to lead this country to continued success in the new millennium.

Recommendations

It is recommended that further study be conducted on games and simulation in addition to other instructional methods for educating students with disabilities in technology education courses.

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Biography

ELINOR FOSTER-BLACKWELL is an Assistant Professor in the Department of Graphic Communication and Technological Studies in the division of Computer Aided Drafting and Design. Elinor Blackwell earned a BS in Industrial Engineering, a MS in Technology Education, an Ed.D. in Technology Education with a minor in School Administration.