Influencing Technology Education Teachers to Accept Teaching Positions

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Abstract

Technology education is facing a significant teacher shortage. The purpose of this study was to address the technology education teacher shortage by examining the factors that influence technology education teachers to accept teaching positions. The population for the study consisted of technology education teachers and administrators. A survey instrument was developed that asked participants to indicate their level of agreement on 28 factors influence on whether a technology education teacher accepts a teaching position. A five point Likert scale was used to determine level of agreement. The results of the study revealed that the factors believed to most influence a technology education teacher to accept a teaching position included having resources available for the classrooms and labs, having resources for professional development, and a collaborative work environment. Discussions include recommendations for the development of technology education teacher recruitment programs, as well as policies that positively impact recruitment.

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Introduction

For many years technology education, as well as other areas of education, have been experiencing a significant teacher shortage. Research conducted by Meade and Dugger (2004), Ndahi and Ritz (2003), Newberry (2001), Ritz (1999), and Weston (1997) have all indicated that technology education has been and will continue experiencing a significant teacher shortage unless action is taken to reverse this problem. Wicklein (2005) stated that technology education is facing no greater issue than the teacher shortage and indicated that in order to address this issue efforts need to be undertaken to recruit more technology education teachers. This study sought to identify effective recruitment techniques by determining the factors that influence technology education teachers to accept teaching positions. The study utilized the survey technique to gather perceptions from technology education teachers and administrators who were elected officials in state technology education associations.

Literature Review

Over the past few years, technology education has experienced a renewed emphasis within American schools. A major reason for this new emphasis is that a key component to technology education is the preparation of learners to be technologically literate (ITEA, 1996). With the No Child Left Behind legislation requiring technological literacy for all students, schools are developing new technology education programs to meet the students' needs. Meade and Dugger (2004) found that an increasing number of states are beginning to require technology education as a school subject for all students, and 43 states reported using the Standards for Technological Literacy developed by the International Technology Education Association (ITEA). New technology education programs have been implemented rather extensively in junior highs and high schools across the United States, with many states and districts still in the process of bringing technology education to the middle schools, and others reportedly expanding existing middle and high school

programs (Daugherty, 1998; Weston, 1997). Technology education's emphasis on technological literacy and states' commitment to technology education standards for all students is increasing the number of students participating in technology education programs. This shift has created a new demand for technology education professionals, and this demand is exacerbated by the current and projected teacher shortages in technology education (Ritz, 1999).

At the same time increasing numbers of students are required to take technology education courses at the elementary, junior high, and high school level, the number of teachers entering the field is decreasing (Daugherty, 1998). The 2000 *Educator Supply and Demand in the United States* study developed by the American Association for Employment in Education (AAEE) reported the national need for technology education teachers was on the increase (AAEE, 2001). Studies conducted by Weston (1997), Ritz (1999), Newberry (2001), Ndahi and Ritz (2003), and Meade and Dugger (2004) have all indicated significant shortages of technology education teaching professionals.

Volk (1997 however pointed out that although the number of traditionally certified technology education teachers is decreasing, with alternative certification programs such as Troops to Teachers, there may be teachers available to help schools address their shortages. Therefore, by constructing effective recruitment programs, school district may be able to attract individuals to choose teaching over other available occupations (Guarino, Santibanez, Daley, & Brewer, 2005).

Teacher Recruitment

There are many reasons an individual chooses to accept a position. Understanding what might motivate an individual to accept a teaching position is an important aspect for school districts to consider when addressing the current teacher shortage. The most prominent theories related to career motivation include Maslow's hierarchy of needs theory (Maslow, 1943) and Herzberg's dual-factor motivational theory (Herzberg, 1966). Maslow's theory as it pertains to career motivation, states that individuals seek to satisfy

five levels of needs from their job. These needs include physiological, safety and social needs to start, and ultimately the need to satisfy their self-esteem and self actualization (Maslow, 1943). Herzberg's theory builds on the needs identified by Maslow by separating them into two unipolar groups, hygiene factors and motivation factors. Hygiene factors include the extrinsic aspects of a job including salary, management, and working conditions, while motivation factors include such intrinsic aspects as recognition, responsibility, and the nature of the work (Herzberg, 1966). These theories provide an initial understanding of what could motivate a technology education teacher to accept a teaching position and lays the framework for addressing the issue of recruiting more technology education teachers.

States are responding to address the teacher shortage through a variety of measures (Hoepfl, 2001). In order to improve the quality and quantity of qualified teachers, expanded recruitment efforts are becoming an important and significant aspect for individuals involved in education and policy-making (Banks, 1999). Wicklein (2005) found that technology education professionals perceive the recruitment of individuals into technology education teacher education programs as the most critical issue in technology education. In making recommendations for addressing this issue, Wicklein suggests "undertaking significant efforts aimed at recruiting and preparing new technology education educators at all levels" (p. 9).

Research conducted by Elam (1990), Scarborough (1990), Sharpe (1992), and Daugherty (1998) point out that effective recruiting begins with the image of the field. They suggest that building an image campaign for technology education might be an effective starting point for a recruitment plan. Federal programs such as the Troops to Teachers program (Kuenzi, 2004) have also been enacted to attract new technology education teachers. This program is intended to recruit members of the military with expertise in mathematics, science, and technology-based fields into teaching positions after completing their military service. The program assists eligible members of the Armed Forces to obtain certification and facilitates their employment (Kuenzi, 2004). Schools also use a

similar method to recruit teachers by offering alternative routes of teacher certification to qualified individuals. Alternative certification programs vary, and include those that offer certification to individuals that have already earned a bachelor's degree and have work experience, to those that train already certified teachers to teach technology education courses (Simmons & Linnell, 1998).

In order to address the teacher shortage and recruit those more qualified teachers, states have also implemented incentive programs to attract such individuals. One such recruitment strategy is the use of signing bonuses for new teachers. An example of such a program exists in Massachusetts. Between 1998 and 2001, the Massachusetts Institute for New Teachers (MINT) gave a $20,000 signing bonus to over 400 individuals who changed to teaching mid-career to address the state's teacher quality and supply issues (Kuenzi, 2004). About one-third of the participants in the program already had some form of teacher certification or teaching experience, and the rest were subject matter experts who were given a six-week teacher training program. The program also included weekly mentoring sessions for teachers. Many states experiencing significant teacher shortage in content areas such as math, science, bilingual education, and technology education are initiating signing bonuses in order to attract new teachers to fill positions (Marquez, 2002).

Another incentive program that states are using to recruit teachers is a loan deferral and forgiveness program for educators. According to the Wisconsin State Department of Public Instruction (2005), Missouri State Department of Elementary and Secondary Education (2004) and Iowa State Department of Education (2004) websites, each state offers loan deferment or forgiveness to teachers in areas of critical need. Loan deferment programs allow full-time teachers in areas of designated need to postpone the repayment of student loans that were borrowed between 1987 to the present. Loan forgiveness is only offered to teachers who initiated their loan after 1998. Teachers who initiated their loan before 1998 are not eligible for loan forgiveness, but are granted a reduced interest rate. Each of these three states offering loan deferment or forgiveness has designated technology education as an area of critical teacher shortage.

While many areas of education are experiencing teacher shortages, several studies have focused on reasons teachers leave the teaching profession. Few studies however have identified factors that influence teachers to accept teaching positions. Studies conducted by Puget Sound Educational Service District (PSESD) (2003) and Hare and Heap (2001) have examined factors influencing teacher recruitment within Washington State and selected Midwestern states respectively. Marquez (2002) conducted a study that examined the factors that influenced the recruitment of bilingual education teachers. Additionally, Barrows and Wesson (2003), Lee, Clery, and Presley (2001), and Weiss (1999) identified job satisfaction factors that may impact teacher recruitment. However, if the teacher shortage in technology education is to be addressed, specific studies addressing the factors that influence the technology education teacher labor supply are needed.

Hanushek, Kain, and Rivikin (2001) stated that without a full understanding of the factors influencing the teacher labor supply, effective policies and strategies to address the teacher shortage will not be developed. This study sought to expand the knowledge regarding the technology education teacher labor supply by focusing on the factors that influence technology education teachers to accept teaching positions. The purpose of the study was to determine the factors most influential in whether a technology education teacher accepts a teaching position. Based on the findings of this study, effective recruitment policies can be developed for technology education.

Methodology

The design of this study examined factors that influence technology education teachers to accept teaching positions. The study specifically utilized the survey method. The general purpose of survey research is to generalize from a sample population so that inferences can be made about the perceptions of the total population (Babbie, 2001). The study sought the perceptions of technology education teachers and administrators who served as elected officials in their respective state technology education associations. This

population was defined as described for several reasons. First, a population was needed that involved both technology education teachers and administrators. These individuals were chosen because of their specific knowledge of technology education, and the factors that influence technology education teachers to accept teaching positions. Second, by the nature of their involvement in a technology education association as an elected officer, they may have a higher commitment to technology education resulting in a higher, more accurate response. Third, state technology education elected officers are elected to represent all of the technology education teachers and administrators in the state. Therefore the perceptions of those technology education teachers and administrators responding to the survey should represent other technology education teachers and administrators in the state. Finally, individuals in the state technology education associations elected positions were available to the researcher. The names, positions, and contact information were available on the state association websites or through contacting each association directly.

After extensive research of the International Technology Education Association website and state technology education association websites, 32 states were determined to have technology education associations with a total of 489 elected officers. The 489 elected officers consisted of approximately 401 technology education teachers and 88 technology education administrators. Elected positions in state technology education associations are voluntary positions which consist of board members including presidents, vice presidents, past presidents, president elects, secretaries, treasurers, and other state board positions including regional/district representatives. This study only surveyed technology education teachers and administrators. Board members who represented universities and community colleges were excluded.

The researcher developed a survey to determine the factors that influence technology education teachers to accept teaching positions. The initial survey development was guided by three instruments including The Job Satisfaction Survey (Spector, 1985), Recruitment and Retention Issues Survey (PSESD, 2003), and Retaining and Attracting High Quality Teachers Survey (Hare & Heap, 2001).

These surveys served as a guide in the development of the survey's broad categories and general factors influencing teacher recruitment. Factors specific to technology education were determined by the researcher through the review of literature.

The content validity of the survey instrument was established by means of a panel with expertise technology education (n = 5). The panel consisted of five technology education professionals from two regional Midwestern universities. They examined the instrument for grammar, clarity, and understanding. Additionally, the survey instrument was pilot tested with technology education teachers (n = 34) and technology education administrators (n = 10) at the Association of Career and Technical Education (ACTE) conference in December of 2005 to determine internal consistency reliabilities of the scales and to assess understandability. A Cronbach Coefficient Alpha test was conducted for the pilot test instrument to determine the internal consistency of the instrument and to establish reliability for the survey instrument. After eliminating two categories from the survey, a reliability index of .969 was determined for the instrument.

The survey consisted of a demographic section and a recruitment factors section. The section of the survey collected basic demographic and background variables of the technology education professional to provide a better understanding of the population sample. The second section listed 28 recruitment factors, which were categorized as pay, promotion, benefits, contingent rewards, operating conditions, nature of work, and communication. Table 1 lists the 28 factors.

The second section asked participants to respond to each factor, and rate each as to its influence on whether a technology education teacher accepts in a teaching position. A five-point Likert-type scale was used for each of the items with "1" representing strongly disagree that the factor is influential and "5" representing strongly agree that the factor is influential.

Table 1
Factors influencing technology education teachers to accept teaching positions

Factor	Category
	Pay
Factor 1	The salary offered is comparable to that of the national average ($30,000)
Factor 2	Technology education teachers are given salary schedule credit for relevant non-teaching experience
Factor 3	The school places higher demand teachers, such as technology education teachers, above entry-level on the salary scale
Factor 4	The school provides yearly raises for all teachers
	Promotion
Factor 5	There is a career ladder for technology education teachers in the school district
Factor 6	Technology education teachers are promoted based on performance
Factor 7	Technology education teachers can move up the career ladder quickly
Factor 8	Technology education teachers are promoted based on tenure procedures
	Benefits
Factor 9	There are resources available for professional development
Factor 10	The technology teacher is offered a student loan payoff
Factor 11	The technology teacher is offered a tuition waivers or reimbursement
Factor 12	The technology education teacher is given a signing bonus
	Contingent Rewards
Factor 13	Successful teachers are given non-financial rewards
Factor 14	Successful teachers are recognized within the district
Factor 15	Teachers are financially rewarded for school and program success
Factor 16	The school provides increased compensation for quality teaching

Table 1 (continued)

Table 1 (continued)

	Operating Conditions
Factor 17	Resources are available for the classroom and labs
Factor 18	Class sizes are average (20 to 25)
Factor 19	The school provides retraining of faculty and staff
Factor 20	The school has a university partnership to recruit, alternatively certify, and train teachers
	Nature of Work
Factor 21	The school is using the Standards for Technological Literacy
Factor 22	The technology education teacher is given the grade they prefer to teach
Factor 23	The technology education teacher is given the subject they prefer to teach
Factor 24	Technology education teachers are traditionally certified.
	Communication
Factor 25	There is a new teacher induction program to orientate new teachers to the school
Factor 26	There is a mentoring program in place to help new technology education teachers.
Factor 27	There is a collaborative work environment
Factor 28	Teachers are involved in the decision-making process

The data collection process began in January of 2006. The 489 participants selected for the study were each sent a personalized email introducing the project, describing the purpose of the study, providing instructions for completing the survey online, assured confidentiality, and directing them to the site where the instrument could be completed. The researcher attempted to increase the response rate by requesting the assistance of state technology education association presidents, president-elects, and executive directors. Each of these individuals was sent personalized emails asking for their assistance in the study and for them to encourage their board members and regional/district representatives to participate. A follow-up mailing was conducted exactly one week after the first and a final follow-up was sent two weeks after the first

mailing. Of the initial 489 surveys sent, 95 were returned as undeliverable and 230 of the 394 participants receiving the mailing (58.4%) returned the survey.

Findings

Data collected were analyzed and used to determine the factors influencing technology education teachers to accept teaching positions. Descriptive statistics were calculated for both demographic information and the factors including means, standard deviations, frequencies, and percentages. Frequencies, means, and standard deviations were used to summarize and describe participant responses to the factors that influence technology education teachers to accept teaching positions.

An analysis of the demographic data received from the study indicates that participants from all 32 states surveyed responded to the study. The majority of those responding to the study (83.0%) identified themselves as technology education teachers (see Table 2).

While only 20 respondents classified themselves as administrator, an additional 7 respondents identified themselves as both teachers and administrators and 12 respondents identified themselves in the *other* category. Additionally, approximately 30.4% of respondents (n = 70) worked at the elementary/middle school level and 11.3% (n = 26) worked at the state/district level, while the majority of the respondents 54.8% (n = 126) indicated they worked at the high school level. Finally, respondents were more evenly split between locations with 22.6% of respondents in rural areas (n = 52), 29.1% located in towns or small cities (n = 67), 33.0% in suburban areas (n = 76), and 13.5% respondents in urban areas (n = 31).

Means ranged from 2.49 to 4.06 on a Likert-type scale (1 = Strongly Disagree, 2 = Disagree, 3 = Undecided, 4 = Agree, 5 = Strongly Agree) for the recruitment factors (see Table 3). There were a total of 13 recruitment factors rated with means of 3.5 and above (agree) on the scale. There were 15 recruitment factors rated with means below 3.5 (disagree or undecided) on the scale.

Table 2

Descriptive information about the respondents

Variable	*N*	%
Position Held		
Teacher	191	83
Administrator	20	8.6
Both	7	3
Other		
State Supervisor	8	3.4
Program Specialist	1	<.01
State Consultant	1	<.01
Department Head	2	<.01
Area of Work		
Elementary	70	30.4
High School	126	54.8
State/District Level	26	11.3
Other		
Both or K-12	8	3.4
Location		
Rural	52	22.6
Town or Small City	67	29.1
Suburban	76	33
Urban	31	13.5
No Response	4	1.7

Table 3
Responses to all factors relating to whether a technology education teacher accepts a teaching position

				Frequency of Response (Percentage)				
Factor	N	Mean	SD	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Factor 1	230	3.7	1.194	13 (5.7)	35 (15.2)	26 (11.3)	91 (39.6)	65 (28.3)
Factor 2	230	3.12	1.406	43 (18.7)	38 (16.5)	44 (19.1)	58 (25.2)	47 (20.4)
Factor 3	229	2.85	1.471	62 (27.0)	38 (16.5)	44 (19.1)	58 (25.2)	47 (20.4)
Factor 4	229	4.01	1.157	11 (4.8)	22 (9.6)	19 (8.3)	78 (33.9)	99 (43.0)
Factor 5	229	2.92	1.39	48 (20.9)	50 (21.7)	39 (17.0)	56 (24.3)	36 (15.7)
Factor 6	230	2.49	1.304	68 (29.6)	63 (27.4)	35 (15.2)	47 (20.4)	17 (7.4)
Factor 7	228	2.8	1.281	44 (19.1)	57 (24.8)	53 (23.0)	49 (21.3)	25 (10.9)
Factor 8	229	3.26	1.312	31 (13.5)	35 (15.2)	52 (22.6)	65 (28.3)	46 (20.0)
Factor 9	230	4.05	0.97	6 (2.6)	14 (6.1)	24 (10.4)	104 (45.2)	82 (35.7)
Factor 10	230	2.81	1.541	75 (32.6)	27 (11.7)	41 (17.8)	41 (17.8)	46 (20.0)
Factor 11	230	3.09	1.523	56 (24.3)	31 (13.5)	36 (15.7)	50 (21.7)	57 (24.8)
Factor 12	230	2.69	1.571	81 (35.2)	38 (16.5)	30 (13.0)	33 (14.3)	48 (20.9)
Factor 13	228	2.96	1.347	50 (21.7)	34 (14.8)	44 (19.1)	74 (32.2)	26 (11.3)
Factor 14	229	3.65	1.14	16 (7.0)	23 (10.0)	37 (16.1)	102 (44.3)	51 (22.2)
Factor 15	228	2.66	1.453	73 (31.7)	43 (18.7)	31 (13.5)	51 (22.2)	30 (13.0)
Factor 16	230	2.63	1.483	79 (34.3)	42 (18.3)	27 (11.7)	50 (21.7)	32 (13.9)
Factor 17	230	4.06	1.051	8 (3.5)	17 (7.4)	21 (9.1)	91 (39.6)	93 (40.4)
Factor 18	230	3.86	1.134	14 (6.1)	20 (8.7)	22 (9.6)	103 (44.8)	71 (30.9)
Factor 19	230	3.55	1.217	18 (7.8)	35 (15.2)	32 (13.9)	93 (40.4)	52 (22.6)
Factor 20	230	2.89	1.339	46 (20.0)	49 (21.3)	51 (22.2)	52 (22.6)	32 (13.9)
Factor 21	228	3.7	1.176	15 (6.5)	28 (12.2)	28 (12.2)	97 (42.2)	60 (26.1)

Table 3 (continued)

Table 3 (continued)

Factor 22	229	3.38	1.21	20 (8.7)	40 (17.4)	42 (18.3)	87 (37.8)	40 (17.4)
Factor 23	230	3.82	1.089	9 (3.9)	21 (9.1)	43 (18.7)	86 (37.4)	71 (30.9)
Factor 24	229	3.18	1.143	20 (8.7)	42 (18.3)	74 (32.2)	63 (27.4)	30 (13.0)
Factor 25	230	4.03	1.069	10 (4.3)	15 (6.5)	22 (9.6)	93 (40.4)	90 (39.1)
Factor 26	229	3.96	1.063	11 (4.8)	15 (6.5)	23 (10.0)	104 (45.2)	76 (33.0)
Factor 27	230	4.05	0.986	6 (2.6)	14 (6.1)	28 (12.2)	97 (42.2)	85 (37.0)
Factor 28	230	3.84	1.1	14 (6.1)	15 (6.5)	31 (13.5)	104 (45.2)	66 (28.7)

Five factors received mean ratings of 4.00 and above. The factors perceived by the respondents as most influential in whether a technology education teacher accepts a teaching position were that the school provided yearly raises for all teachers (4.01), the school has resources available for professional development (4.05), the school has resources available for the classroom and labs (4.06), the school has a new teacher induction program to orientate new teachers to the school (4.03), and the school has a collaborative work environment (4.05).

In addition to the above factors, respondents also perceived that having a salary comparable to that of the national average (3.70), having the school district recognize successful teachers (3.65), having average class sizes (3.86), providing retraining for teachers and staff (3.55), using the Standards for Technological Literacy (3.70), having the teacher teaching the subject they prefer (3.82), having teachers who are participating in a mentoring program in place to help new technology education teachers (3.96), and involving teachers in the decision making process (3.84) were also influential factors in whether a technology education teacher accepts a teaching position.

When these results are compared to other studies, similarities can be found in relation to factors such as operating conditions and communication. This study found similar results to PSESD (2003) and Hare and Heap (2001), which identified class size, technology

resources in the classroom, and providing staff retaining to be effective recruitment strategies. This study also found new teacher induction programs, mentoring programs, a collaborative work environment, and involving teachers in the decision making process to be influential in whether a technology education teacher accepts a teaching position. Studies by Darling-Hammond (2003), PSESD (2003), Marquez (2002), and Hare and Heap (2001) present similar findings.

Along with indicating the factors perceived to be influential in whether a technology education teacher accepts a teaching position, this study also identified 15 factors that were perceived to have little to no influence on whether a technology education teacher accepts a teaching position. The four factors perceived to have the least influence were promoting technology education teachers based on performance (2.49), increased compensation for quality teaching (2.63), financially rewarding teachers for school and program success (2.66), and offering a signing bonus (2.69). Other factored identified as having little or no influence of note include offering teachers a student loan payoff (2.81), offering tuition waivers or reimbursement (3.09), paying a higher entry salary for technology education teachers (2.85), and offering a salary schedule credit for relevant non-teaching experience (3.12).

Research conducted by PSESD (2003), Marquez (2002) and Hare and Heap (2001) each found that factors relating to promotion and contingent rewards were not influential in whether a teacher accepts a teaching position. This study found similar results. The results relating to pay and benefits however were found to contrast with the finding of the other studies. Hare and Heap (2001) found paying more for non-teaching experience and placing new teachers on a higher pay scale to be effective recruitment strategies, while this study indicated that these were not influential. This study also found contrary results to research conducted by Marquez (2002) and Hare and Heap (2001) in relation to signing bonuses. The results of this study indicated that providing a signing bonus is not influential in recruiting teachers, while the previous studies found signing bonuses to be effective recruiting strategies.

Conclusions and Recommendations

When examining the results of the study, factors perceived as influential could be useful in developing programs and policies to recruit technology education teachers. For instance, the results of this study would indicate that policies could be developed to establish a more collaborative work environment, involve teachers in decision making, and recognize successful teachers. This study also shows that schools might benefit from adopting the standards for technological literacy. Schools that develop induction and mentoring programs for teachers have been shown to increase the likelihood of teachers accepting a teaching position in other studies (Brown, 2003), and the results here support those findings.

While some of the factors perceived as influential are related to financial resources, most do not indicate that the level of financial changes needed to address the factors are unreasonable. Even school districts that are currently underfunded may be able to address some of the following factors by reallocating funds to areas that are perceived to be more influential in attracting new teachers. For instance, the finding of this study indicated that the programs most widely used to recruit teachers in school districts including signing bonuses, tuition waivers, and student loan payoffs were all perceived to have little to no influence. This study also found that factors such as providing higher salaries and raises for just technology education teachers were perceived as having less influence. This would suggest that schools could better utilize these resources to recruit technology education teachers by acquiring technology resources for the classroom, paying teachers comparable to the national average, providing yearly raises, or providing resources for professional development.

While technology education continues to experience a teacher shortage, it is especially important to recruit as many teachers as possible. As other studies are needed to focus on recruiting new technology education teachers into teacher preparation programs, Volk (1997) pointed out that with programs like Troops to Teachers alternatively certifying other professionals, schools can begin addressing their teacher shortage by recruiting teachers already in the

field. These findings could be helpful to school districts and states alike in providing a better understanding of the technology education teacher population and in developing programs and policies that actually entice more teachers to accept teaching positions. While more research is needed on addressing the technology education teacher shortage, we start the process by implementing effective recruitment strategies so that the technology education profession is not forgotten.

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