Mentoring Teachers in Technology Education: Analyzing the Need

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Abstract

Mentoring programs have been shown to have an influence on the overall success of retaining teachers. Studies have shown that not only are teachers who participate in mentoring programs more likely to stay in teaching positions, but also the overall economic value of retaining teachers goes beyond the cost savings related to attrition. Beginning technology education teachers typically participate in the same traditional mentoring programs all teachers follow. These programs tend to overlook the unique nature of a technology education teacher's job. Because a technology education teacher's job generally requires additional and sometimes more stressful duties, such as lab components, this study sought to address the areas that traditional mentoring programs overlooked. Specific attention was paid to technology education teachers' need for assistance regarding technical experts and managing a laboratory environment.

This study applies the situational mentoring framework (SMF) model to address the issues related to mentoring programs for technology education teachers.

Purpose of this Paper

Although mentoring programs have been effective in retaining beginning teachers in general, a review of literature regarding mentoring programs for technology education teachers reveals limited to no research on the topic. More specifically, there is currently no research addressing the overall effectiveness of mentoring programs or the development of a mentoring program (model) for technology education teachers. The purpose of this article is to examine the current status of mentoring pr ograms within technology education by focusing on (a) the overall benefits and effectiveness of mentoring programs, (b) the unique aspects of technology education that are overlooked within traditional mentoring programs, and (c) the methods for developing and implementing effective mentoring programs within technology education. In order to address the unique aspects of technology education, the situational mentoring framework (SMF) will be applied for the systematic development of a model mentoring program for technology education teachers.

Teacher Shortage

Few would argue that the field of education is facing a significant teacher shortage. Numbers do not lie: there were more than 60,000 reported teaching vacancies in the United States during the 2003-2004 school year (Mihans, 2008). Even though many fields of education have experienced teacher shortages, several areas of study are particularly troubling. Technology education and its allied fields have been experiencing a shortage of qualified teachers for approximately 20 years. This problem is exacerbated because, as demands for a technologically literate society increase, so has the demand for technology- related subjects at the elementary, secondary, and post-secondary levels. Meade and Dugger (2004), Ndahi and Ritz (2003), Newberry (2001), Ritz (1999), and Weston (1997) indicated that technology education has experienced and will continue to experience a significant teacher shortage unless educators act to reverse this problem.

Teacher Attrition

Although there is a shortage of teachers, many studies have indicated that this is not necessarily the result of a lack of newly trained teachers. According to Ingersoll and Smith (2003), much of the teacher shortage issues are the result of a "revolving door," whereby teachers leave the profession early. An estimated 50% of new teachers leave the profession after 5 years (Ingersoll & Smith, 2004). Reasons a teacher might leave the profession vary.

In general, these factors include low salaries; lack of career advancement, professional development, or administrative support; student and peer issues; and other school/ environment-related concerns (Darling-Hammond, 2003; Ladwig, 1994; Marlow, Inman, & Betancourt-Smith, 1996; Marso & Pigge, 1997; McCreight, 2000). Researchers who specifically considered attrition rates in technology education found similar results, with additional frustrations for technology education teachers related to a lack of funding for equipment, supplies, and facilities plus a lack of understanding and support for technology education by administrators and counselors (Wright, 1991; Wright & Custer, 1998).

These are all certainly important factors to address for schools systems, administrators, and other teachers who wish to retain teachers, but what factors typically result in a teacher's leaving after one year? Anyone who has taught can certainly remember the difficulties of the first year. Teaching is often done in isolation. Ingersoll (2003) likens a teacher's first year experience to being "lost at sea," because new teachers are often left to fend for themselves within the confines of their own classroom (also referred to as the sink-or-swim year).
Within any profession, new employees usually are at a significant disadvantage; most often they are not given much support during their first year on the job. (It takes an entire year in any job to begin to understand the subtleties of politics, the demands of people in charge and peers, and the quality and quantity of work that is expected.)

Technology education teachers in particular can face a significantly difficult first-year experience. On top of the same difficulties any new teacher would face, such as developing effective instruction and managing a classroom, technology education teachers have the tasks of trying to integrate various technologies into the classroom, managing labs, and developing hands-on projects. As new teachers focus more on surviving the first difficult years, they often focus less on pedagogical developments for the classroom. In addition, technology education courses have been and often continue to be perceived as "vocational." These classes can be filled with students who the administration and teachers believe are not college bound. The new technology education teacher therefore may have a classroom of many students, even classrooms of students, who are less prepared to learn. Even the most experienced teacher would have difficulties within this environment. Finally, new technology education teachers often have few colleagues to turn to for help. Depending on the school, many of the new technology education teachers' peers could have limited experience with a lab-based environment.
Therefore, all new teachers as well as new technology education teachers can experience many problems, challenges, and issues that could have a significant impact on whether they remain teachers.

Along with this overarching strain on the technology education teacher, the burden of teacher attrition places a significant hardship on schools as well. As schools must recruit new teachers to replace teachers who leave, and a job search can result in extensive resources plus significant costs for a school/school system. The turnover costs attributed to hiring, training, and adjusting to the learning curve of new teachers can be staggering (Texas State Board for Educator Certification, 2004). Schools (superintendents, principals, administrators, etc.) should spend the required time in effectively filling teaching positions, but they often settle for inexperienced teachers, teachers who meet only basic requirements, or substitute teachers who have limited knowledge of either the subject matter or teaching in general. As these new teachers adjust to the position's learning curve, their students' academic preparation may suffer, resulting in a negative impact on the school's overall performance.

Additional strain is placed on schools as teacher attrition increases. In particular, schools are burdened with hiring teachers with subject matter knowledge relevant for technology education. In the past, technology educators relied on two solutions for addressing teacher shortages: giving emergency certifications and hiring teachers from fields similar to technology education. Emergency certification is used when an individual has a bachelor's degree and technical knowledge but does not have teacher certification; this certification is given temporarily so a person can fill the open job. Such a teacher will go through an alternative certification process eventually to earn a teaching certification, but his/her first years of teaching are spent with limited knowledge of pedagogical techniques. Ruhland and Bremer (2002) found that alternatively certified teachers felt less prepared in the area of pedagogy than did traditionally certified teachers. The practice of hiring teachers from allied fields is also common within technology education to fill open teaching positions. Teachers from mathematics, biology, and other science subjects are hired to fill technology education positions. The case for hiring someone from an allied field is based on the idea that the knowledge areas are similar enough for the teacher to succeed.

In both cases, these new teachers experience issues within the classroom. The emergency certification teachers can have difficulties due to limited experiences as classroom teachers, and teachers hired based on having certification in a "similar area" can have limited experiences with an applied/hands-on environment that is typical of technology education. In either case, the school and students themselves often suffer while such new teachers develop the necessary skills to provide effective instruction.
This time period could be weeks, months, or perhaps even years.

Induction and Mentoring Programs

To address the high teacher attrition rates, many schools have implemented induction and mentoring programs. Induction and mentoring programs have been designed to offer new teachers opportunities to share experiences and ideas; additionally, they can collaborate on classroom concerns with veteran teachers.
The most common form of induction is the mentoring program (Feiman-Nemser, 1996). The purpose of the mentoring program is to establish a workplace relationship between a veteran and a beginning employee, and it is based around the premise that employees learn good practices through several years of study, consultation with experienced peers, and reflective practices (Fox & Certo, 1999). Researchers have continuously indicated that mentoring programs can increase the retention of beginning teachers (Brown, 2003; Darling-Hammond, 2003; Kajs, 2002; McCormick, 2001).

Overall Benefits of Mentoring Programs

Many teachers and administrators would agree with the research that induction and mentoring programs are effective in retaining teachers, but what makes these programs effective? Mihans (2008) pointed out that what makes mentoring of teachers so effective is purely the necessity of the profession. According to Mihans (2008), "teaching is the only profession that requires the same responsibilities of its beginning practitioners as its masters" (p. 763). This would seem to suggest that successful mentoring starts with the very existence of a mentoring program, but clearly effective mentoring goes deeper than the simple existence of a program. Regardless of type of mentoring program, several key benefits of mentoring programs have been identified.

One of the key and main benefits of a teacher mentoring program is increased teacher retention. Mentoring programs have been designed to address some of the key factors that result in beginning teachers' leaving the profession. Even though the level of increased retention will vary based on the type of program, Ingersoll and Smith (2004) pointed out that the probability of teacher turnover is reduced when teachers participate in induction and mentoring programs. This reduction in teacher turnover has other benefits than simply maintaining the number of teachers within the school district. For example, Villar and Strong (2007) conducted a benefit-cost analysis of teacher mentoring programs and found that increases in teacher effectiveness due to mentoring programs actually outweighed cost concerns related to attrition. Therefore, while mentoring programs can be beneficial in reducing the cost of turnover, the financial benefits go beyond simple turnover.

While assisting beginning teachers is the primary goal and benefit stream for mentoring programs, experienced teachers who participated as mentors can also benefit from such programs. Mihans (2008) indicated that experienced teachers can view mentoring as an incentive to stay in the teaching profession because they can learn from and share with colleagues, while providing the leadership roles that are important in retaining experienced teachers. This would indicate that the practice of mentoring for teachers may not only reduce the likelihood that beginning teachers would resign, but also it may help reduce the number of teachers who exit the teaching profession altogether.

Research conducted by Steinke and Putnam (2007) found that one of the primary influential factors in technology education teachers' staying in a teaching position is whether they participated in an induction and mentoring program. Therefore, the benefits associated with mentoring certainly are applicable to addressing attrition within technology education.

What Traditional Mentoring Programs Overlook

Despite the known benefits of mentoring programs, not all are effective. As Ingersoll and Smith (2004) pointed out, the kinds and numbers of support provided by schools to beginning teachers vary, as does their effect on retention. Currently, there are no standards for mentoring new teachers, and programs can vary from one school district to the next. In a 2001 study conducted by the American Federation of Teachers (AFT), only 21 states had established guidelines for the selection of mentors. The type of mentor selected and the overall mentoring process can have a significant impact on whether a mentoring program is effective. Gratch (1998) found that the simple presence of a mentor does not guarantee success. Mentors who are not given instructions on how to effectively teach adults, for example, probably will not create effective mentors (Gratch, 1998). Traditional programs that simply assign a mentor might overlook factors that are important to teachers within a particular field such as technology education.

Ingersoll and Smith (2004) indicated that one of the strongest factors related to retention is having a mentor from the same field. Within technology education, this establishes a problem because technology education already faces a significant lack of teachers within the field, so the odds for new technology education teachers having a mentor within the field are not great. Most schools will likely find that providing mentors from a "similar field" is a sufficient answer for mentoring teachers within technology education. The issue here is if teachers from science or mathematics have sufficient backgrounds in technology education to effectively mentor technology teachers. Brown (2003) indicated that lab environments are different than traditional classrooms and have different procedures than traditional classrooms. Additionally, Brown (2003) indicated that lab-based teaching environments, such as technology education, must also organize internships, service learning, and monitor cooperative learning activities. Mentors for teachers within these lab environments must be familiar with the procedures, equipment, and processes of a typical lab.

Because mentoring programs are designed to address teacher attrition, it is important for mentors to be familiar with key factors that impact whether teachers leave the profession. Certainly the typical mentoring program will be designed to address the reasons why the average teacher leaves, but technology education teachers have been found to leave for a variety of reasons. Wright and Custer (1998) and Steinke and Putnam (2007) found that a lack of funding for supplies and equipment can affect the retention of technology education teachers. Clearly mentors within technology education must be familiar with and able to address issues involving technology resources in classrooms and labs. In addition, Steinke and Putnam (2007) found that technology education teachers are concerned with the long hours required to deliver a quality program, the low status of technology education, and the lack of understanding of what technology education is among administrators and colleagues. These are all factors that affect the overall retention of technology education teachers that many traditional mentoring programs do not address.

Technology education teachers who do not receive the needed support in their first years are more likely to leave the teaching profession because technology education offers professionals the opportunity to make much higher wages working in non-teaching careers (National Association of State Boards of Education, 1998). It is therefore imperative to provide the proper support to technology education teachers early, including the development of mentoring programs that address the main areas of concern for technology education teachers. In order to develop a successful mentoring program for technology education teachers that address these concerns, a systematic approach should be used.

Technology Education Mentoring Programs

In designing an effective mentoring program for technology education teachers, there are many different factors to consider. Technology education teachers encounter different issues than the many teachers, but school districts may also have a difficult time addressing those issues through standard mentoring programs. School districts need a process for developing a mentoring program that is adjustable and allows for situational variability. Kajs (2002) suggested the situational mentoring framework (SMF). This model has four components that include: (a) mentor selection, (b) mentor and novice teacher preparation, (c) support team, and (d) accountability. The four components are interrelated and the approach is dynamic, allowing for changes related to technology, processes, and personnel. For this reason, the SMF is ideal for developing the foundations of an effective mentoring program for technology education teachers. Each of the four components is considered next and how each can specifically be used to design an effective mentoring program for technology education teachers are discussed.

Mentor Selection

Selecting the right mentors and matching those mentors with the proper protégés can be crucial in any mentoring relationship. The SMF model calls for a collaborative process to ensure the proper selection of mentors by using a systematic process for their selection (Kajs, 2002). Though it is the task of a selection committee during this component to develop criteria for potential mentor candidates and determine a pool of prospects, Allen, Eby, and Lentz (2006) pointed out that this process should really focus on allowing individuals to feel as though they have as much input into the matching process as possible. The more a formal mentoring program simulates an informal mentoring relationship, the more effective it will be (Allen, Eby, & Lentz, 2006).

During the mentor selection process, the process of creating an informal-feeling mentoring relationship begins with determining a pool of experienced expert teachers that are willing to take on the responsibility of mentoring (Kajs, 2002). Allen, Eby, and Lentz (2006) indicated that both creating a sense that the program is voluntary to potential mentors and looking at the proximity and background of the mentoring pool are important. For example, they found physical distance between mentors and protégés can be a challenge in a mentoring relationship, along with a mentor's overall knowledge of a department/area of study. Once a pool is identified, the prospective mentors and novice teachers should spend time discussing different viewpoints relating to mentoring, as well as potential relationships. This will create a sense of perceived input into the mentoring process between both groups, as well as provide needed input for properly matching mentors to protégés.

This process in particular can be beneficial for technology education teachers. First, actively identifying a pool of experienced teachers to be mentors through a formal process may increase the number and quality of teachers who are willing to participate. This is particularly important in technology education, given the nature of the lab-based teaching environment. Second, by focusing on the proper selection of mentors and allowing them to get to know the novice teachers, novice technology education teachers are more likely to be assigned a mentor who understands their jobs and potential difficulties. The prevailing practice of simply assigning an experienced teacher to mentor a novice certainly does not allow for this likelihood. Finally, if an insufficient number of qualified mentors are available or one is not identified for a technology education teacher, a formal mentoring selection process allows for a principal/committee to identify and request the participation of an experienced teacher to fill that need (Papalewis, Jordan, Cuellar, Gaulden, & Smith, 1991). Since a shortage of technology education teachers already exists, this may be necessary. If an experienced technology education teacher is unavailable, this issue could be addressed in the fourth component Support Team (discussed later).

Mentor and Novice Teacher Preparation

Many traditional mentoring programs assume that an experienced teacher has the knowledge and skills necessary to be an effective mentor. The reality is that the knowledge and skill set to be an effective teacher is different than the knowledge and skill set to effectively mentor a colleague. Although most formal mentoring programs offer some form of training (Allen, Eby, & Lentz, 2006), many tend to be more informational than knowledge based with skill development (Kajs, 2002). Therefore, the SMF model emphasizes the need for both mentors and novice teachers to develop skills to promote an effective relationship (Kajs, 2002).

A variety of different types of knowledge and skills are needed in order for a mentor to be successful. In particular, Hanuscin and Lee (2008) identified skills such as listening skills, knowledge of effective teaching, modeling inquiry, and helping a new teacher to focus on students' thinking as important. These identified knowledge and skills building on the work of Kajs, Willman, and Alaniz (1998) and others, who identified the stages of teacher development, adult learning principles, and professional development assessments as important for mentors. Additionally, the SMF model stresses the importance of developing the interpersonal skills of novice teachers. Eby and Lockwood (2005) indicated that providing training to help novice teachers develop appropriate expectations and clarify the objectives and purpose of the program should improve the quality of the mentorship.

By addressing the overall knowledge and skills of the mentors in the development of the mentoring program, there is an increased likelihood that the issues novice teachers face with be addressed. Within technology education, mentors, in particular, should be aware of and able to deal with the specific needs of new technology education teachers. For example, given the nature of the lab-based technology education classroom, mentors may need to be aware of and able to deal with specific safety- and technology-related concerns. This creates a two-fold advantage for technology education. It develops technology education mentors who can address a variety of concerns and feel comfortable dealing with different equipment, procedures, and classroom environments. Additionally, given the potential lack of experienced technology education teachers to participate as mentors, detailed mentor development may allow other teachers to provide valued assistant to novice technology education teachers.

Support Team

Providing a support team or supporting system for mentors is something few traditional mentoring programs offer. Hanson (1996) indicated that given the increased responsibility mentoring put on a teacher, the time constraints associated with mentoring can have a negative affect. As mentioned previously, given a potential lack of experienced teachers or teachers within a specific field of study, such as technology, mentors might experience frustration with these limitations (Kajs, 2002). The SMF model uses the development of a support team to address these limitations and frustrations.

Support teams can be designed to include a variety of different experts from areas such as different campuses and school districts; they can even incorporate university educators who demonstrate the necessary knowledge and skills to help novice teachers (Kajs, 2002). Support teams can be used to identify the necessary knowledge and skills needed for mentors and protégés, provide training, assist current mentors reducing their time commitment, and can be used to evaluate and improve the mentoring process. Since the physical distance between mentor and protégé can affect the success of the relationship (Allen, Eby, & Lentz, 2006), the use of support teams can also create a feeling of closeness between the mentor and protégé by providing more options for support. Finally, Kajs (2002) concluded that because the support team includes different participants from the school district, both the novice and the experienced teachers may feel a higher degree of commitment for the mentoring program.

Since many school districts may have very few experienced teachers who have lab and technology background to be effective mentors for novice technology education teachers, support teams may provide a solution to this issue. Technology educators specifically can see significant benefits of including and using a support team by identifying and providing a committee of individuals, both in the school district and out, who can be of assistance to technology education teachers. For example, the support team may consist of technology education professionals from within the school district, from a school district nearby, from a regional two- or four-year college, and from state and national teacher associations. Each member of the support team may have experiences with different concerns related to managing a lab, dealing with student, and developing programs and internships. The support team can work individually with each novice teacher to determine concerns and offer support in different ways, whether face-to-face or via electronic means. The advantages are that experienced technology education professional has a chance to collaborate, the mentor's time commitment is reduced, and the novice teacher gets the needed support.

Accountability

Many traditional mentoring programs lack a feedback loop or systematic method for measuring the success of the program. Even though all programs encounter various barriers to success, a systematic means for determining what is accomplished and how the process can be improved is important. The SMF model can be used to develop a systematic plan of program benchmarks. Kajs (2002) indicated that these benchmarks can be met through a series of observations to ensure: (a) appropriate pedagogy is modeled and practiced, (b) work in the classroom is assessed and improved, and (c) mentor/protégé interactions are constructive. The advantage of developing such a component allows for the overall assessment and improvement of the program. Additionally, building in accountability and benchmarks provides a guide for both mentors and protégés to strive toward. Providing measurable goals for both the mentor and protégé to follow also makes scheduling of visits easier and can be helpful in guiding development activities. Within technology education, the accountability component can provide an opportunity for both experienced and novice teachers to reflect on current practices and make improvements to enhance student learning. Given the changing nature of technology, it is particularly important for technology education teachers to reflect on their teaching methods and determine new ways to incorporate and change with technology.

Conclusion

An effective mentoring program not only can enhance the abilities of teachers, but it also can have a significant impact on overall retention of teachers. By successfully retaining more teachers, school districts can address the significant teacher shortage; additionally, costs may be contained or at the very least kept at an acceptable level. While the development of a comprehensive mentoring program using the SMF model may be more expensive and time consuming than a traditional mentoring program, such a cost would be offset by the overall reduction in cost related to teacher attrition (Villar & Strong, 2007). The SMF model provides a systematic approach and structure for the development of an effective mentoring program, and it can provide the needed components to address the issues currently overlooked by traditional mentoring programs (Kajs, 2002). In particular, this systemic approach is needed to address the issues that may be overlooked in a traditional mentoring program concerning technology education. The field of technology education continues to experience a significant teacher shortage (Meade & Dugger, 2004; Ndahi & Ritz, 2003; Newberry, 2001; Ritz, 1999; Weston, 1997), while traditional mentoring programs continue to overlook: (a) the lab-based nature of technology programs, (b) issues related to a lack of funding for supplies and equipment, and (c) the need for mentors with similar backgrounds and technical expertise.

Even though the SMF model is an appropriate step for developing effective mentoring programs for technology education, other areas of research must be undertaken to make this happen. First, given the need for the development of knowledge and skills for mentors, research should be conducted to determine the specific knowledge and skills needed for technology education mentors. A study could be developed to consider knowledge and skills, paying close attention to the knowledge and skills that are most frequently used, most critical, and most difficult to master. This study could then be used to develop effective development activities for technology education mentors. Another study could then be initiated to measure the overall effectiveness of these development activities, looking specifically at issues of mentor and protégé development, increases in teaching effectiveness of novice teachers, and the difficulties of retaining teachers.

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