

Technology Education Teacher Demand, 2002-2005

It is clear that there is a shortage of teachers, especially technology education teachers.

The technology education teaching profession is concerned about teacher supply and demand. In 1997, the International Technology Education Association (ITEA) published a study projecting the shortage of technology education teachers (Weston, 1997).

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Weston's data projected technology education teacher needs through 2001. This is a follow-up of that study, which is continuing to be monitored by Old Dominion University.

Nationally, publications continue to report the need for teachers. Although the data varies, a report by the National Center for Education Statistics (NCES) has estimated that the U.S. will need between 1.7 and 2.7 million teachers by 2008. Even with the number disparity, they predict that 66 percent of U.S. teachers are expected to retire or stop teaching in the next decade (CNN.com-Reuters, 2002). Many of these departures are attributed to teacher dissatisfaction, "As many as 33% of new hires leave teaching altogether in

their first three years, and 46% leave in the first five years" (Ingersoll, 2002).

The 2000 *Educator Supply and Demand in the United States*, developed by the American Association for Employment in Education, reports that the national need for technology education teachers was 4.17 on a five-point scale, indicating some shortages. Figures reported between 5.00 and 4.21 indicated considerable shortages. Regions with considerable shortages of technology education teachers were the Great Plains/Midwest (4.44; Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota), Southeast (4.31; Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia), Mid-Atlantic (4.54; Delaware, District of Columbia, Maryland, New Jersey, New York, and Pennsylvania), and the Northeast (4.29; Connecticut, Maine, Massachusetts, New Hampshire, and Vermont). The need for technology education teachers increased on a five-point scale by .14 from 1999 to 2000 (AAEE, 2001). This study is available online at www.aee.org. Also an additional study by Alexander, Allen, and Nelson (1998) revealed that a serious shortage of technology education teachers exists in the U.S.

Methods of Data Collection

An instrument modeled after that of Weston's (1997), was sent to the lead technology education specialist (supervisor, director, etc.) for each of the 50 states. Additional questions were developed to find if technology education curricula were beginning to be changed and be based on *Standards for Technological Literacy*. Questions were also asked to determine how states were coping with the shortage of technology education teachers.

Forty surveys (80%) were initially completed and returned. Follow-up telephone calls were made to the ten non-respondents or their designees. All surveys were returned for a 100% response rate.

Findings

Teacher Supply

There were 16,774 middle school technology teachers and 19,487 high school technology teachers for a total of 36,261 technology education teachers employed during the 2001 school year in the U.S. Table 1 shows the number of technology education teachers employed in the U.S. by state, as of fall 2001. In the 1997 Weston study, it was estimated that 37,968 technology education teachers were employed. One state did not respond to the 1997 study. Two states did not know how many technology education teachers they employed when responding to the 2002 study. Overall, this study showed that there are 1707 fewer technology education teachers employed in the U.S. between 1997 and 2001.

Teacher Demand

Table 1 also displays the projections for additional middle and high school technology education teachers needed for 2001 (2337 estimate), 2003 (3033

estimate), and 2005 (3648 estimate). A review of the 2001-2002 *Industrial Teacher Education Directory* (Bell, 2002) shows that 71 U.S. universities produced 672 technology education teachers in 2001. This would indicate that, for the 2001 school year, the technology education teaching profession was short 1665 licensed teachers (needed, 2337; produced, 672). This raises the question as to whether programs were closed or if non-licensed or emergency licensed teachers filled these vacancies.

Standards for Technological Literacy

In addition to the demand for technology education teachers through 2005, this study sought information on states' revisions of their technology education curriculum, if the states were providing alternative routes for teacher licensure, and if the state's teacher education institutions were meeting the demand for technology education teachers. Table 2 indicates that 43 states (86%) were incorporating *Standards for Technological Literacy* into their curriculum materials (at the local or state level). Seven states (14%) indicated they were not incorporating the *standards* in technology education curriculum revisions at the current time.

Alternative Licensure Routes

When asked if the state was providing routes to alternative teaching certification/licensure, 39 states (78%) indicated that they were employing alternative routes to licensing technology education teachers; 11 (22%) were not. Providing alternative licensure approaches can assist states in meeting some of their shortages for technology teachers. The Council on Technology Teacher Education has produced a monograph, *Alternative*

Licensure Models for Technology Education, suggesting guidelines that states may follow to effectively prepare teachers through alternative means (Litowitz & Sanders, 1999). It is important that some consistency be involved in alternative certification so that these newly licensed teachers are prepared to implement *Standards for Technological Literacy*.

Supply/Demand

Finally, in the 2002 survey, state supervisory personnel were asked to judge whether their technology teacher preparation institutions were providing sufficient numbers of licensed technology teachers to meet the demand for their state's school systems. Only two states, Alabama and New York, felt that their technology teacher preparation programs were meeting their teacher needs, Table 2. Forty-eight states (96%) did not believe their teacher preparation institutions were preparing sufficient numbers of technology education teachers to meet present demands.

Discussion

It is clear that there is a shortage of teachers, especially technology education teachers, and the shortages will continue to increase. This is supported by the data reported through this study and others cited. School systems in general are facing huge challenges in dealing with the teacher shortage. Declining enrollments in teacher education (Isabel & Lovedahl, 1989; Miller, 1991; Hill, 1999) are not the only causes of shortages of teachers in our subject area; factors such as poor working conditions, lack of administrative and community support and economic, political, and school reform efforts are contributing to the teacher shortage as well (Gursky, 2001;

Table 1.
Current Number of Technology Education Teachers and Projected Needs,
2001, 2003, 2005

States	Teachers		Middle School			High School		
	Middle High School	High School	2001	2003	2005	2001	2003	2005
Alabama	120	85	10	15	20	5	10	15
Alaska	-	300	-	-	-	-	-	-
Arizona	250	435	-	25	30	-	25	30
Arkansas	65	10	2	3	4	2	3	4
California	1224	1224	-	-	-	-	-	-
Colorado	138	287	22	18	16	39	31	28
Connecticut	450	290	20	25	30	25	85	40
Delaware	36	62	7	10	15	8	10	20
Florida	1064	760	49	52	58	49	52	59
Georgia	230	350	20	20	30	30	30	50
Hawaii	10	5	2	2	2	-	-	-
Idaho	40	168	2	3	5	8	10	12
Illinois	900	900	50	75	125	50	75	125
Indiana	650	650	15	25	35	15	25	35
Iowa	280	550	28	35	56	55	82	110
Kansas	210	430	20	30	35	25	30	45
Kentucky	125	225	8	10	15	12	14	20
Louisiana	100	350	3	10	20	5	15	15
Maine	230	110	20	24	30	12	14	18
Maryland	510	511	36	-	-	37	-	-
Massachusetts	375	275	6	10	15	6	10	15
Michigan	425	425	50	75	100	50	75	150
Minnesota	380	500	15	25	30	20	35	40
Mississippi	0	395	0	0	0	60	65	75
Missouri	343	580	195	260	275	244	270	310
Montana	75	175	10	12	15	15	18	20
Nebraska	256	256	22	22	22	25	25	25
Nevada	70	10	10	15	15	-	-	-
N. Hampshire	80	110	5	5	5	5	5	10
New Jersey	700	800	-	-	-	-	-	-
New Mexico	150	150	-	20	20	-	25	25
New York	1700	1750	50	50	50	50	50	50
North Carolina	360	350	30	45	60	20	30	40
North Dakota	30	81	2	4	5	5	10	12
Ohio	1000	1000	-	-	-	-	-	-
Oklahoma	175	100	10	15	20	5	10	15
Oregon	-	-	-	-	-	-	-	-
Pennsylvania	1200	900	100	150	150	100	100	125
Rhode Island	30	50	2	3	3	3	4	5
South Carolina	125	75	5	5	5	2	0	0
South Dakota	42	32	0	1	1	2	2	3
Tennessee	209	140	2	-	-	3	-	-
Texas	706	1498	75	100	125	75	100	125
Utah	200	250	15	30	30	15	30	25
Vermont	-	-	-	-	-	-	-	-
Virginia	571	468	47	70	75	46	70	75
Washington	-	300	75	75	100	75	100	100
West Virginia	95	120	10	10	10	10	10	10
Wisconsin	600	750	5	5	5	69	80	95
Wyoming	245	245	0	4	5	0	5	5
Totals	16,774	19,487	1,055	1,393	1,667	1,282	1,640	1,981
Grand Totals	36,261		4,115			4,903		
						9,018		

Weaver 2000). This means our profession must not only look at how to prepare additional teachers, but how to retain them in the teaching profession after they are prepared.

Supervisors and teacher educators must explore alternative means to technology education teacher licensure. Alternatives can be used in the short term. States used alternative means in earlier decades when there were not sufficient numbers of licensed teachers. Many states now have career-switcher programs that require a B.S. or B.A. degree, passing scores on Praxis 1 and 2, and completion of a summer institute on strategies used to teach.

If alternative means are used to fill the current void, what types of mentorships or programs are being designed/used to assist the newly qualified teachers? What are/will these non-traditionally prepared teachers learn about curriculum redesigns, including *Standards for Technological Literacy*? If our profession believes that our curriculum should reflect new and different approaches to teaching our subject matter, how might we reach our new teacher population, since this study showed that a number of states remain obstinate to the needed changes in technology education?

One approach toward assisting new teachers who enter technology education classrooms/laboratories is to make them aware of state-developed technology education instructional materials and the vast amount of resources available through the International Technology Education Association to assist them with their daily work. Much technology education instructional information can be found using the World Wide Web. ITEA's Web site, www.iteawww.org, should be provided to new teachers so that its mate-

rials may be accessed. New teachers can learn from accessing ITEA's Idea Garden or communicating with successful teachers through *Teacher Chronicles*, where experts in the field can be asked questions pertaining to success in our specialized teaching field.

Also, it might be suggested that we, the members of the technology education profession, need to ensure that we have the qualified teachers that we need in the future. If all high school teachers made a commitment to send one member of this year's graduating class to pursue a teaching degree in technology education, we could eradicate the technology education teacher shortage in a four-year time frame. We are the technology education profession. It is our responsibility to correct the supply and demand dilemma for our profession. Recruit one; you can make the difference.

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The National Association of Manufacturers' research arm has recently reported on the poor state of America's guidance counseling. *Decisions Without Directions* reports the results of a survey of high school juniors and seniors, showing that just 10 percent said school personnel had played the primary role in their career guidance (www.ferris.edu/htmls/administration/president/CI/ncds.htm). Technology education teachers need to take a greater role in counseling their students to become technology education teachers!

Table 2.
Standards Implementation, Alternative Certification, and
Teacher Preparation

STATES	Is Your State Revising Curriculum to Reflect Standards for Technological Literacy?		Is your State Providing Alternative Certification?		Is Your State Providing Enough Quality Technology Education Teachers?	
	YES	NO	YES	NO	YES	NO
Alabama	✓		✓		✓	
Alaska		✓	✓			✓
Arizona	✓		✓			✓
Arkansas	✓		✓			✓
California		✓	✓			✓
Colorado	✓		✓			✓
Connecticut	✓		✓			✓
Delaware	✓		✓			✓
Florida	✓		✓			✓
Georgia	✓		✓			✓
Hawaii		✓		✓		✓
Idaho	✓			✓		✓
Illinois	✓		✓			✓
Indiana	✓		✓			✓
Iowa	✓		✓			✓
Kansas	✓		✓			✓
Kentucky	✓		✓			✓
Louisiana	✓			✓		✓
Maine		✓	✓			✓
Maryland	✓		✓			✓
Massachusetts	✓		✓			✓
Michigan	✓			✓		✓
Minnesota	✓			✓		✓
Mississippi	✓		✓			✓
Missouri	✓		✓			✓
Montana	✓		✓			✓
Nebraska	✓		✓			✓
Nevada	✓		✓			✓
New Hampshire	✓		✓			✓
New Jersey		✓	✓			✓
New Mexico	✓			✓		✓
New York		✓	✓		✓	
North Carolina	✓		✓			✓
North Dakota	✓		✓			✓
Ohio	✓		✓			✓
Oklahoma	✓		✓			✓
Oregon	✓		✓			✓
Pennsylvania	✓			✓		✓
Rhode Island	✓			✓		✓
South Carolina	✓			✓		✓
South Dakota	✓		✓			✓
Tennessee	✓		✓			✓
Texas	✓		✓			✓
Utah	✓		✓			✓
Vermont	✓			✓		✓
Virginia	✓		✓			✓
Washington	✓			✓		✓
West Virginia		✓	✓			✓
Wisconsin	✓		✓			✓
Wyoming	✓		✓			✓
Total	43	7	39	11	2	48