

- Ministry of Education.
- Working with authorities in Egypt to issue a separate law that regulates

vocational training that is separate from the current labor law. This is needed due to the special nature of

the vocational training process (PPIU, 1997).

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2. Does the Recent Literature in Technology Education Reveal the Profession's Direction?

by Jane A. Liedtke

A review of the research literature in technology education conducted by Zuga (1994) included dissertations and research literature published between 1987 and 1993 that focused on technology education and technology teacher education. She summarized the research as follows:

- 50 percent of the research is devoted to curriculum status, development, and change.
- 63 percent focuses on secondary education
- 53 percent studies teachers/teacher educators. (p. ix)

Under what Zuga (1994) described as "Unfulfilled Promises," a key statement was made:

A concern and goal of the field has been to establish a discipline of technology education and with that to fulfill the goal of creating technological literacy. What is interesting is that no research has been done to this end. No discipline was created and none may ever be able to be created given the nature of people's involvement and use of technology. Disciplines are formed when communities of scholars working together can agree that such a discipline exists. Technology educators are but a small part of the community of scholars who are technologists. (p. 66)

Publishing is one activity indicative of a community of scholars. Thus, there should be a direct relationship between what research is conducted and what articles are appearing in our journals and as ERIC documents. It may come as no surprise that this relationship is a very weak one. Given the size of our profession, little research is being conducted and even less research is being published. Those who do publish are writing about those subjects that tend to be the current "hot topic" (the Internet, robotics, design briefs, etc.) and less about the "heavy issues" in technology education (technology education as a discipline, technological literacy, pedagogy for and learning of technology, attitudes, external groups to the profession such as parents and school administrators, etc.).

Status of literature in technology education. Literature on technology education has been narrowly confined to a few journals and ERIC documents. A search of the library databases found that in ERIC many documents (mostly curriculum materials) are catalogued under technology education descriptors. However, in searching databases for periodical literature and subject searches for books, the descriptor tech-

nology education (or combinations, technology with education, technology and education, etc.) yielded a large number of articles and books with little to no relationship with what our profession would view as technology education. Because the databases are using descriptors that are not narrowly defined or specific to our profession, our literature is lost to the outside world seeking to find information using accepted library search tools. This does not mean that our literature is not "out there" to be found. What it means is that it is mostly confined to ERIC and only those library databases that search a very broad range of journals (including those within our field).

What journals are related to our profession? Many journals and magazines serve the broad spectrum of topic areas related to technology education. Brauchle, Liedtke, and Loepp contributed a list of more than 100 technology-related journals that are well suited to the field. It is included in *Preparing Manuscripts for Professional Publication in Technology Education* (Brauchle & Liedtke, 1997). Domestic and international professional associations as well as trade and technical organizations provide a wealth of resources for

technology teachers. For the purpose of this article, five publications were reviewed that are most specific to technology education and where most of the literature consistent with the philosophy of technology education is found.

What are the key journals in technology education? *The Technology Teacher* (ITEA), the *Journal of Technology Education* (ITEA), the *Journal of Industrial Teacher Education* (NAITTE), the *Journal of Technological Studies* (EPT), and *TIES* magazine are considered to be the main sources of literature in the field. Classroom teachers of technology education and technology teacher educators review these sources for information on curriculum and research. In addition, the annual Yearbooks of the Council on Technology Teacher Education are considered to be leading sources of information on their respective subjects. Magazines such as *Tech Directions* are popular among teachers due to the nature of their distribution.

What are we reading in the journals? A review of the five publications identified was conducted for the purpose of this article.

The most recent 12 issues (as of Winter 1996) for each publication were examined with the exception of the *Journal of Technology Education*, where nine issues were reviewed. Three hundred and thirty-two articles were categorized by the classifications given below:

- Philosophy of Technology Education (such as technology education as a discipline, standards for technology education, technological literacy, history).
- Curriculum and Instruction Information (such as program design, content and structure, mathematics-science-technology interface, delivery, interdisciplinary approaches, outstanding or model programs).
- Facilities (instructional laboratories and equipment).
- Technological Systems (such as communication, manufacturing, construction, transportation, biorelated technology systems).
- Student Activities (student-centered activities and "how to do xyz" in the classroom with students, student organizations).
- Research (articles about conducting

research versus those based on research).

- Professional Issues (leadership, mentoring, recruitment, minorities).
- General Interest (the Internet, grant writing, partnerships, resources).
- Others (articles that are not technology education).

Table 1 provides a sense of what has been published in these publications and thus what represents the majority of our current literature. Technology education articles represented 67% of that which was published therein. Of the 222 technology education articles, 22.5% were related to technological systems and the curriculum organizers of communication, manufacturing, construction, transportation, and biorelated technology systems. Many articles within this classification were about new technological developments and applications in technology education. Some of these articles related exciting technology content that could easily be adapted to classroom instruction by competent technology teachers. However, the classification of student activities only represented 3.6% of the articles. The perception that *The Technology Teacher* and *TIES* magazine have a lot of "how to" articles for classroom teachers is not the case. These two publications contain the largest number of articles that are focused on technology systems.

Curriculum and instruction information (21% of the articles) was a major area within the publications. This is consistent with Zuga's (1994) review of the research literature which showed that 50% of the research conducted was related to curriculum development, status, and change. More of the curriculum research conducted should be published. The curriculum articles that are published are dispersed evenly across the five publications.

The third-ranked classification was that of general interest, with 41 articles (18%). These included articles related to tech-prep, school-to-work topics, technology education in other countries, and the like. Professional issues ranked fourth with 38 articles (17%). This classification included articles on minority issues and recruitment, leadership, teacher preparation, in-service activities, and similar topics. A large portion of this literature appeared in

Table 1

Number of Articles Published in Five Publications Based on Classifications Given

Classification	Publication*					Totals
	TTT	JTE	JTS	JITE	TIES	
Philos. of T. E.	12	5	9	3	0	29
Curric. & instruc.	10	11	12	5	9	47
Facilities	2	0	0	0	6	8
Technological sys.	17	0	6	0	27	50
Student act.	7	0	0	0	1	8
Research articles	1	0	0	0	0	1
Prof. issues	6	9	19	4	0	38
General interest	12	11	6	4	8	41
Other (not T. E.)	0	5	67	38	0	110
						Subtotal 220
Totals	67	41	119	54	51	332
Journal and magazine issues examined:						
<i>The Technology Teacher</i>						
October 1994–February 1996				n = 12		
<i>Journal of Technology Education</i>						
Fall 1990–Fall 1995				n = 9		
<i>Journal of Technology Studies</i>						
Summer/Fall 1988–Winter/Spring, 1995				n = 12		
<i>Journal of Industrial Teacher Education</i>						
Vol. 29 #4 (1992)–Vol. 32 #3 (1995)				n = 12		
<i>Ties</i> magazine						
March 1991–February 1995				n = 12		

two journals: *The Journal of Technology Studies* (which had the largest number of professional issues presented—19) and *The Journal of Technology Education* (which had the second highest number of professional issues presented—9). This is consistent with the leadership and professional development mission of Epsilon Pi Tau as an international honorary.

Philosophical issues in technology education, standards (Technology for All Americans), industrial arts versus technology education, and technological literacy ranked fifth with 29 articles (13%). The publishing of these topics was primarily in *The Technology Teacher* and *The Journal of Technology Studies*.

Articles that met the criteria of “other” were primarily within the areas of vocational education, trade and industrial education, and industrial technology. *The Journal of Industrial Teacher Education* had the largest number of vocational and trade and industrial education articles. *The Journal of Technology Studies* had the largest number of industrial technology articles most reflective of industrial management degree program efforts among the five publications reviewed. The *Journal of Industrial Technology*, which was not reviewed, would have exceeded the *Journal of Technology Studies* with the percentage of industrial technology articles if it had been included.

The CTTE Yearbooks, considered to be valuable literature by our profession, have over the same period of time been devoted to communication in technology education (1990), technological literacy (1991), transportation in technology education (1992), manufacturing in technology education (1993), construction in technology education (1994), and foundations of technology education (1995). Of these six yearbooks, 75% of the content is devoted to curriculum and technological systems with 25% focused on philosophical issues, historical perspectives, and technological literacy.

How much of the focus is on classroom teachers (K-12) versus teacher preparation? *The Technology Teacher* and *TIES* magazine are classroom teacher oriented. Of the 67 articles published in *The Technology Teacher*, 34 clearly target classroom teachers with

many of the philosophical, general interest, and professional issues articles applicable to a wide range of professionals. *TIES* is targeted to a larger extent toward the classroom teacher. Forty-three of the 51 articles were classroom teacher (K-12) focused. This accounts for 84% of the articles published.

Very little was written on technology teacher preparation. Two prime articles were on teacher preparation curriculum and college student burnout. One article was concerned with the NCATE accreditation process. One could suggest that the technological systems and curriculum topics would relate to teacher education in terms of content that would be taught once students entered the profession as classroom teachers. In recent years there is little literature focusing on the needs of college students, college student organizations, and the curriculum for technology teacher preparation. The CTTE Yearbooks, while focusing on the public schools, provide outstanding reference materials for teacher preparation courses. One chapter was devoted to teacher education in each of the yearbooks for the four curriculum organizers (communication, construction, manufacturing, and transportation) and the yearbook on the foundations of technology education. Despite this, there remains a great need for research and articles devoted to issues of teacher preparation and certification.

How much of the focus is on guidance counselors, principals, school district personnel, parents, business/industry, government, and other gatekeepers? Is this a missing element in our publications? Two articles were on school-to-work transitions (which relate to business/industry as a recipient of high school graduates). Other than those two articles, there was not one article that focused on this group of important people in the educational setting. Here is a need waiting to be met! The profession needs assistance in linking with these key individuals. Classroom teachers and teacher educators need models in the literature that provide strategies for working with these groups to ensure a positive future for technology education. Articles targeting publications within counseling and school administration professional as-

sociations are also essential to creating a broad range of literature on technology education.

What about the science and mathematics education journals? Are we publishing our efforts at integrating mathematics, science, and technology through curriculum projects in these publications? Only three integration articles appeared in the five technology education publications reviewed. With several major national efforts ongoing in our profession to integrate mathematics, science, and technology, classroom teachers and teacher educators seem eager (as evidenced by the popularity of such sessions at the ITEA conferences) to learn more about the successes of these curriculum development efforts.

Is quality the issue or a problem? Having reviewed as a member of the editorial review boards for all but one of the five key publications, I can honestly say that what is submitted by members of our profession is alarming. What is published, while much better than what is submitted, tends to lack depth or has not been prepared based on extensive research support. That is not to say that there are not wonderful, useful articles in our journals. It is to point out that much of what we do could be better.

It is more likely a reflection on our profession and our background, interests, and personal attributes. Individuals have selected our field over other professions because they prefer to work with technology. They are often not interested in writing and publishing. This creates a strategic dilemma. Individuals need to conduct research and publish—few do as Zuga (1994) pointed out in her research review. Publishing is an expectation of faculty at higher education institutions. People who are not successful with their first attempt at publishing often do not resubmit their publication and may not be motivated to publish in the future. Alas, a small group of individuals become successful at publishing. Something must be done. We can intuitively wonder: What good ideas and information are we missing out on that people have rolling around in their heads?

Modeling may also be an issue. People tend to model and emulate what exists in the literature regarding writing

style, format, and, in some instances, topics (acceptable to the journal).

What are our focal points for future action?

Some observations:

- Few people publish.
- Most research conducted has not been published.
- Technology education as a discipline must be clearly defined, disseminated, and operationalized.
- Lack of research base in most literature or lack of depth on the topic(s) is evident.
- Little to no theoretical basis for our research and thus the literature that stems from the research lacks the rigor of other disciplines.
- Lack of experimental research (controlled research investigations and appropriate data analyses).
- Lack of literature on technology teacher education, mathematics/ science/ technology interface and interdisciplinary approaches, in-service programs, and certification issues.
- Little attention to diversity, minority recruiting, and retention.
- Counselors, parents, school administrators, and business/industry and their relationship to technology education have received no attention in our journals.

Some possible directions:

- Rewards and incentives for publishing.
- Increased opportunities to publish refereed articles.
- Mentorships for publishing (linking young professionals with seasoned writers).
- Promote interdisciplinary cooperation and study of technology to facilitate the acceptance of a discipline for the study of technology.
- Require doctoral research for the PhD degree to have a theoretical base and include experimental methodologies.
- Require publication from dissertations as a part of doctoral degrees.
- Expect publication as a result of grant activity.
- Provide increased funding for research activity (expanding our reach to other types of funding agencies).
- Link with colleagues outside our field to prepare and publish articles.
- Involve counselors, parents, and school administrators in our professional associations.
- Provide journal subscriptions to other professionals at our institutions.
- Encourage minorities and women to publish and provide support systems to enable this to occur.
- Seek funding for journals to support

their publication costs, thus enabling refereed publications to be a reasonable length.

How can practitioners help?

As technology educators, we have the opportunity to share our successful classroom experiences, results of master's and doctoral research, and perspectives on issues facing the profession. Engaging in such activity creates the environment conducive to a community of scholars. Moreover, it assists others in recognizing technology education as a discipline. It is imperative that we assist those who prepare technology education and technology-related journals in delivering publications that meet the needs of in-service and preservice teachers, teacher educators, school administrators, parents, and, ultimately, students. Beyond that, we must connect to those who are on our periphery. To achieve this end, we must all try to publish the fruits of our labor and be diligent about sharing beyond these mainstream publications.

Journal editors are eager to link less experienced writers with those who can serve as mentors. This process assists the novice in publishing and thus increases the pool of individuals contributing to the base of literature that serves the profession.

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3. Extending the University's Reach with Technology

by Kurt H. Becker

Using technology has always been an integral part of society. Throughout history, the available technologies of the time dictated the direction of human existence. But, technological developments have had a limited impact on education and have done little to change limited access, low quality, and

low productivity and to improve the primitive technological tools used by teachers.

Our stance toward technology in education—our impressions of what it is, what it is good for, and how we should think about it—has long been a problem. Many of the failures of the

past stem from this problem: The films we expected to revolutionize teaching in the 1920s, the radio broadcasts that would bring the world into every school room in the 1930s, the “new media” of the 1950s and 1960s (television, Super-8 film, language laboratories), the passion for programmed instruction of the