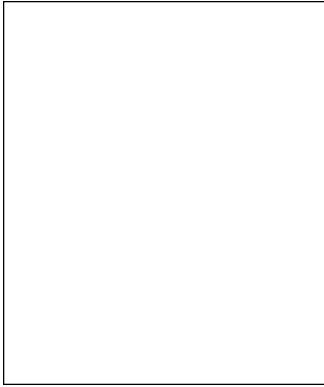


Program Review Produces Dynamic Results: A Case Study of the Evolution of a Master's Program



Paul E. Brauchle

Illinois State University lies in the flat plains of central Illinois, about half way between St. Louis and Chicago, along Interstate 55. The oldest state-supported university in Illinois, it was chartered in 1857. Abraham Lincoln did some of the original legal work that created the campus. Originally a teacher's college, known at that time as a "Normal School," the university resides in a town called—with great economy of logic—Normal, Illinois.

Graduate studies began there in 1943, and by 1996 the 19,000 student university had about 2,646 graduate students in 33 master's and 8 doctoral programs. One of these master's programs resides in the Industrial Technology Department within the College of Applied Science and Technology. The department supports about 450 undergraduate majors and 41 graduate students—a similar proportion of graduates to undergraduates as the university as a whole. The industrial technology graduate program leads to a master's degree in industrial technology with a focus on industrial technical training. That's the way it is now, but that's not the way it was. Ten years ago the program looked like many traditional industrial technology programs that had emerged from our common roots of manual arts, industrial arts, and industrial education. It was loosely focused on a technology/engineering model and was moderately successful. Then something happened that shook the program to its core and caused changes that no one had anticipated, changes that propelled us kicking and screaming into an area where we were not sure we wanted to go and had never been before, into *terra incognita*.

CHALLENGE

The 1986 school year started out uneventfully. Students came and went, classes were taught, and grades assigned. The trouble didn't begin until program review, an intensive process that occurs every 10 years, was implemented. Conducted for the Illinois Board of Higher Education (IBHE), program review is supposed to improve higher education programs, but the process is often seen as a way to prevent duplication of programs and to shut down unwanted ones. Still, the faculty were not worried. Numbers are very important, and there were about 32 students in the program at that time. They took three required courses (Technical Writing, Research, and Seminar) and elective upper level undergraduate tech-

nical courses that could be taken for graduate credit. Many signed up for courses they thought would look good to an employer seeking an industrial engineer, and although the program was not accredited by the Accreditation Board for Engineering and Technology (ABET), many were obtaining engineering-related jobs anyway. Things looked good. The program was healthy. Graduates were getting jobs. What more could one want?

"Several things," said IBHE, after reading the program review document. For one, it wanted to know more about the *vertical articulation* of the program. Just what was the relationship between the undergraduate and graduate programs? What was the difference between a baccalaureate and a master's degree? Didn't a master's student in this program just take more undergraduate technical courses? If so, what value was added? And how about *horizontal articulation*? With so few required courses, what was the commonality of experience and skills found in program graduates? And, by the way, how about the qualifications of faculty? How many of them are engineers? And, why isn't the program ABET accredited?

A number of soul-searching responses led to dead ends. The faculty were not happy. They were not satisfied with the program's focus. The IBHE was not satisfied with the answers it had been given. The administration was not satisfied with the way program review was going. It looked bad. Another approach was needed, but what would satisfy this multiplicity of needs? How *could* the undergraduate and graduate programs articulate? What was the commonality of the program's graduates? In what areas *were* the faculty all qualified for instruction?

POSSIBILITIES

The answer came almost out of desperation. The department surveyed its graduates to find out if they did have commonalities in performance, and if so, what they were. The responses revealed an interesting trend among program graduates. It turned out that whether they were technicians, industrial engineers, or entrepreneurs, all had the challenge of imparting information about technology to others. In fact, their professional success usually depended on the ability to make sure that other people knew exactly what their jobs were and how to do them at a high level of performance.

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This was especially true when new materials, machinery, or processes were introduced. Yes, there was a common element. It was training. Technical training. And it solved very nicely the problem of horizontal articulation. In a training-focused program, master's graduates would have the common goal of improving technical performance through training. But what skills were needed to accomplish this? The American Society for Training and Development (ASTD) was consulted. Skill sets for trainers were reviewed. Critical skills were identified. The most important ones would end up in the program's core courses. Others could be taken as electives. In addition to competence in one of the recognized areas of industrial technology, all students would develop essential skill sets for training and development. As graduates, they would be able to go into an industry or business; conduct a needs, job, and task analysis; and develop, deliver, and evaluate the training enterprise. If we could guarantee these skills in graduates, we felt certain that they would be successful in the labor market.

The problem of *vertical articulation* proved more difficult, but it finally yielded to the argument that program graduates would still be involved with technology. The only difference is that they would also have to master a different *application* of the technology they had mastered when they were undergraduates. Now they would not just be technicians, they would be industrial technical trainers. Thus, a value-added component was provided. Moreover, by focusing on industrial technical training, the department could use existing faculty who were well qualified in technology and employ others who had expertise in training. When this reasoning was submitted to IBHE, it was quickly accepted. Now the department knew what it had to do. It just was not too sure how to go about doing it.

IMPLEMENTATION

The first step was to hire a graduate coordinator, who turned out to be the author of this article. When I was interviewed for the job, I recall Distinguished Professor Franzie Loepp taking me aside and saying, "Well, I know you are interested in this job, but I don't know if we'd be doing you any favors by hiring you. You see, it looks like we are going to lose our graduate program." I opined that if they hired me, that wouldn't happen. Then I returned to Nashville, where I was director of research and development for the Tennessee State Department of Education, thinking, "Now, just how am I going to do *that*?"

It really wasn't that hard. We enlisted the

support of the departmental graduate faculty and the administration. We needed help from the profession, so we formed a Graduate Advisory Board, a group composed of training directors and managers from various industries similar to those in which our graduates might be employed. Representing Motorola University, the Caterpillar Technical Training Institute, Fluor-Daniel, Duchossois Industries, Franklin Life Insurance Company, and IBHE, the Board gave us good advice. One of the first things the Board told us was that we should do some institutional benchmarking. So we visited two fine programs, one at Florida State University and the other at Syracuse University. We reviewed the materials of others, such as the University of Minnesota, the University of Indiana, Arizona State, and San Diego State. What we found was that virtually no one was preparing industrial technical trainers at the master's level. In the words of one well-known human resource development professor, we were probably "sitting on a gold mine." "Perhaps," we thought, "this is a niche we should look at more carefully."

When we investigated further, we found that many of America's demographic and economic forces supported industrial technical training as a growth industry. Besides the usual data in support of training and development efforts, there was this fact: Industrial processes, techniques, and equipment are quickly becoming more automated and technical in nature. The technical expertise required to operate them is increasing. The penalty—in terms of dollars and down time—for mistakes is also increasing. Yet most industrial workers had come into manufacturing at a time when minimal skills were sufficient to guarantee employment. Now they were becoming technologically displaced. In an era of strong unions and job rights supported by the courts, it is difficult and expensive, if not impossible, to discharge long-time employees who draw high salaries, even if they are technically deficient. The only solution is to re-train them for the new, more technically advanced operations.

We found that technology transfer consists of two phases. The first one involves the acquisition and installation of hardware and software. We generally do a pretty good job at that. We ship it in, uncrate it, hook it up, and make it run. This phase usually goes pretty well as soon as the initial glitches are corrected. However, the second phase does not always go that smoothly. This phase involves training the workers to use the new technology properly. Unfortunately, we don't seem to do this as well as we do the first phase. Because of our failure in Phase 2, expensive machines

and complicated processes are sometimes damaged or derailed by well-meaning workers who don't really understand how the technology or the processes work. The familiar cry is heard: "But it worked just fine when the vendor was here!" The engineers and technicians understand. They know the processes and they know the technology. But they aren't usually trained to impart skills and knowledge to others. The trainers can conduct training programs, but most trainers in industry aren't technically skilled. So, who can solve the problem? The technical trainer can. That's the individual who has the marriage of training *and* technical skills. This person is uniquely qualified to solve one of industry's greatest challenges: how to enhance the technical performance of employees. That's what needs to be done. The question becomes, "What would a master's program have to have in it in order to create such a person?"

THE PROGRAM

When we consulted with the Graduate Advisory Board, materials from the benchmark schools, and criteria from ASTD, we were able to redevelop the master's program into one that provides the skills that graduates need to be highly successful in a technical training environment. We needed to build a program that drew on the skills and competencies identified by ASTD and that focused on course work in designing professional quality industrial training programs, effectively delivering the programs, and evaluating the effectiveness of the training. Industry wanted entry-level training people who could come into a production setting and conduct a needs, job, and task analysis; identify what level of performance the workers are demonstrating; what level of performance they should be showing; and develop a professional training product to make that difference in performance go away. These competencies were addressed by developing one course. Employers also wanted good platform skills in their trainers and an ability to effectively use a multiplicity of training venues, from one-on-one tutoring to multimedia application. Thus, a second course was born. Then, too, they wanted their people to be able to identify the value added to the business by the training enterprise, hence the third course in the training trilogy. When these courses were added to technical writing, research, and presentation experiences, and rounded out by a graduate internship where students could implement the skills they had learned, we felt we were moving towards a program capable of producing graduates who would have a good chance for success.

We fortified the course work with independent study, special projects, and professional practice opportunities, as well as elective courses from throughout the university. Any upper level technical course may be taken (subject to minor restrictions) in support of the master's degree. We believe that this curriculum promotes needed skills for success in technical training and development and at the same time provides flexibility for individualizing students' programs. Its success is demonstrated by several recent studies.

AND WHAT IT ALL MEANS

Recent research has indicated that this master's in industrial technology has annual credit-hour generation, enrollment, and degrees awarded that place it around the average of similar programs in the state. But it has one of the lowest costs per credit hour in the state. Application and admissions are increasing. The program is attracting more students with career goals to be technical trainers or managers. The addition of industry-funded graduate assistantships and the creation of the Bureau of Training and Development seem to have helped. Graduates are very satisfied that the program has helped them achieve professional success. They have reported an average salary of \$41,800, with a low of \$26,000 (a teacher) and a high of \$61,000 (a trainer). Fifty-three percent said they made more than \$40,000 per year and 24% said they made in excess of \$50,000. Perhaps the most telling results are anecdotal. On one recent Saturday evening, a very successful graduate called me from Texas. He reached me at home. "Doc," he said in a booming voice, "don't change a thing!" Then he hung up. A few minutes later he called me back, saying, "I just wanted you to know that your graduate program is right on target. I use *everything* you taught me *every* week. Don't change a thing!" Well, maybe we'll try not to change *too* much.

Our long-term plans call for establishing three sequence areas in the graduate program so that students will have a diploma that provides a better statement of the program's focus. Recently, our graduate faculty voted to establish three sequence areas: industrial training, technology education, and technology management. We see support for all three and indicators of success for them. We are excited about the future. And, yes, it is again time for program review. This time, we are actually looking forward to it.

Why is all this important to teachers and practitioners of industrial technology? It could be said that we have been blessed over the years because of our strong relationships with

business and industry. I agree. We have provided to industry a commodity that is not readily available elsewhere and that remains in great demand. Competent technicians, technologists, and trainers are essential to industry—if I'm to believe what industrial managers tell me. Yes, our graduates have done well and achieved much.

Yet things change over time, and those changes can affect us all. Demographic and economic changes have created needs in the labor market that simply did not exist several years ago. One of those needs is for the technical training of the workforce. Given the production of technicians and technologists, I

believe we are in the unique position of being able to meet those needs as few others can. We can marry the technical competence of our traditional undergraduate programs with the instructional skills possessed by technology educators to create a new product at the graduate level—one that shows signs of being in the forefront of a new growth industry. The point is that what happened at one institution could happen at others. But they don't all have to go in kicking and screaming the way we did. They can do it carefully, slowly, through an evolution and not a revolution. If I had my choice, that's the way I would do it. Over time. But I would still do it. The potential is there.

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