PANEL DISCUSSION

Transportation Workforce 2000

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Glenda Tate

During the past several years, there have been a number of reports that focus on the workforce of the year 2000 and beyond. What is interesting to note is that these reports are obsolete almost as soon as they come out because the world of transportation is changing so rapidly. This is a challenging topic, one that we need to prepare for, and one worthy of serious discussion.

Data from the Bureau of Labor Statistics (BLS) indicate that about 10 million people, or about 7 percent of the U.S. workforce, are employed in transportation careers. This workforce ranges from those who operate vehicles to air traffic controllers, engineers, safety inspectors, environmentalists, and those who make travel arrangements. Historically, when we look at transportation as a field, we know that of the many job opportunities available, traditionally many have not required an advanced degree. However, again according to BLS data, it is estimated that by the year 2000, 65 percent of all jobs will require more than a high school education, 20 percent will require a bachelor's degree, and only 15 percent will be for the unskilled worker. There is no reason to believe that the transportation field will not follow this pattern. We have already heard about the truck driver whose primary skill used to be the ability to drive a truck. Today, that individual must also know how to use a computer to perform the job satisfactorily. The same is true for the locomotive engineer and many other transportation positions.

When we consider intelligent transportation systems (ITS), we see a field with the potential to provide 21st century answers to 21st century problems, such as ever-increasing traffic congestion and fewer funds for new infrastructure. This is but one example of the impact of technology on our work environment and on the skills that need to be in place to make the promise of technology a reality at work. After all, the technology is only as good as the people who can operate it.

I believe that one of the challenges for us in federal, state, and local governments is to join our partners in the educational arena and the private sector to begin to think about how we prepare our workforce for the year 2000. To paraphrase Rosa Beth Canter at Harvard University, our partnerships must be living systems, evolving progressively in their possibilities. One of the challenges for those of us in the regulatory arena at the U.S. Department of Transportation (DOT) is the whole notion

of intermodalism. For those of you who have any dealings with DOT, you understand how difficult that notion is. In DOT's Strategic Plan, Secretary of Transportation Rodney Slater set the goal of "one DOT." Although this does not mean that modal operating administrations will be eliminated, it does mean that the Secretary wants a culture of intermodal thinking. He wants decisions to be made within an intermodal framework. The leadership at DOT recognizes that if we are going to be in step with the kind of transportation policy we need for the year 2000 and beyond, it is imperative that it be within an intermodal framework.

You have heard comments from Deputy Secretary Mortimer Downey about the Garrett A. Morgan initiative. DOT has put together a publication entitled *Careers in Transportation*. It was developed when we were unable to find anything that provided students with good information about the careers available in transportation, particularly students in high schools and community colleges. One notion that we hear over and over again as we talk about preparing the workforce for the year 2000 is making students aware of transportation careers at an early age. We have heard at this conference that individuals often end up in transportation careers almost by happenstance. We want to change that.

Our panelists will be able to talk about some of these fundamental issues, about the current challenges in attracting and retaining a qualified workforce. We will talk about how to upgrade the skills of the individuals already in the transportation workforce and how to create an environment for continuous learning. We will talk about issues concerning what some refer to as the contingent workforce: how do we bring them into the workforce in order to be able to work effectively?

Robert Coon

We have to look very carefully at what we, the ultimate consumers, want in terms of the product—potential future employees. This panel has been asked to talk about the demand side of the business. I am here today as a user, as one of the largest employers of transportation personnel in the United States, to present my demands.

First, I would like to know what intermodalism is. The conference started by indicating that we were not going to define it, but I think it is very important that we agree on what intermodalism is and how it differs from transportation, distribution, supply chain management. Is it more than multimodalism, which a lot of those in my industry have talked about? Or is it just another buzzword that is formulated by academics and loved by a lot of corporate trainers? We really need a clear definition.

Intermodalism changes all the time. Companies that were not even in the intermodal business are suddenly forced into it just as a matter of survival. A transportation colleague of mine at this conference is with a company called Caliber Systems, which has just been acquired by Federal Express. We were talking about the fact that most people do not realize that about half (52 percent) of Federal Express packages never get inside an airplane. Federal Express is one of the largest trucking companies in America today, a prime example of intermodalism.

Second, I would like to know who owns intermodalism. When I spoke at the Intermodal Association of North America conference, we had one definition. When I spoke at the Council for Logistics Management, there was another definition. There may be a third one at this conference. I recently saw an impressive chart showing how many people are involved in intermodalism; however, the reality is that one request for those involved in transportation education is to help define the vocabulary better. The question then becomes where intermodalism resides. Does it properly belong with the Department of Commerce, the Special Trade Commission? How about DOT? Where within a college or university is it appropriate to place intermodalism as a discipline? If intermodalism is going to succeed as a concept easily transferable from academia to the real world, we need a clear definition of where it resides as well as what it is. Earlier today it was said that logistics properly should be in the core of the business administration curriculum within any college or university. But where does intermodalism fit? We do not find out where that is until we solve the problem of who owns it.

Third, we need to make a clear distinction between what education is and what training is. Who is responsible for student education versus employee training? We are masters at training within our industries. It has been pointed out to me that we at Con-Way spend an entire

week on orientation, during which time new employees see 24 different video presentations. However, although we may be masters at skills training, we are very ignorant when it comes to education.

One of the issues that has not been clearly addressed is not who trains and educates the future transportation job applicant but what is being done about the current employees. A real contribution of colleges and universities to the future of transportation is meeting the need for continuing education in transportation, and not just for the professional level. Twenty-two percent of the drivers we employ today have had some college courses or have a college degree. It is not unusual to find somebody with a master's degree driving a truck.

Fourth, in terms of demand, I would like to offer a challenge: what is the most important thing to teach students who are interested in pursuing careers in transportation or logistics or intermodalism? Although we all have different ideas of what should go into the curriculum, all three user groups represented in a recent conversation on this topic came up with the same answer: we ought to teach them communication, starting with how to listen to the customer, how to listen to other employees and other groups within which they operate, and then how to communicate what is important back to those people. It is not enough just to teach technologies anymore; we also have to teach a bit of sociology. We have to teach people how to operate in groups, how to interact with one another, how to form and be part of a team. In addition to supply management, I suggest we also include change management in every college curriculum that deals with this subject. Team management and project control are concepts that are as important to learn as the concepts of technology or information systems.

Fifth, communication does not just apply at the student level. We need and have yet to see sufficient communication between universities and the private sector. It is not just important for us to ask how we get students into our companies and internships. We must also ask how we get professors into our companies, not just as consultants, but as actual practitioners. How many professors sitting in this room would be willing to call up a company and ask for an internship for themselves? If you do, you will probably get a very positive response. It is not enough for us to tell you what we want and then demand it; we would like to show you. It is important for you to be able to walk into your classroom and say, "I just spent this last summer working on a shipping dock, or in a marine company, doing something in the real world."

Last, as we consider what we want from this conference, we want information, not intervention. We want definition, not regulation. We do not look to groups like this or to government agencies to tell us how to do something because we are very good at doing our jobs. What we would like is better communication, to make sure that everybody is moving in the right direction. We want dialogue, not just recommendations. Most important, although we want national direction, we want these to be local programs.

Mona Christie

I will be speaking from the consulting side of transportation on how we view intermodal transportation education and training and the impact it has on us. It is exciting to see all the different groups represented here with the common goal of a partnership. The reality for us within industry is that education is our future, so we have a very strong vested interest.

We find today, through hands-on experience with projects, that transportation solutions by necessity are becoming more complex. Today's solutions involve more modes than has been the case in the past. The process no longer involves just highway traffic or highway infrastructure. It has become an evolutionary process that requires integration of all the various modes to work together to deliver a solution. Transportation professionals of today and tomorrow need a comfort level to think beyond the past restraints of single modes to be able to meet the transportation challenges of the 21st century.

Intermodal transportation training and education is very important to the future of the transportation industry and practice and to the future of the transportation delivery system to serve the public. The public deserves seamless transportation options that make life and travel easy and safe. Intermodal transportation has definitely become part of the landscape of the future, and our firm wants to be part of that landscape.

A more broad-based approach is needed in terms of personnel skills, training, and experience as they relate to intermodal transportation planning and operations. The highly specialized disciplines of the past are no longer adequate to meet the ever-changing demands of transportation. The current environment demands a broader under-

standing of the various modes of transportation, how they interact, how they function, and who they serve. Today transportation professionals are needed whose expertise crosses all the disciplines and who have a vision of the big picture. Only by understanding the various modes can the transportation professionals of today set a vision, conceptualize, and make plans for the transportation needs of the present and the future.

The greatest personnel and education and training challenges that Kimley-Horn, as a consultant, faces in its intermodal transportation planning practice can be viewed from two perspectives: that of our existing staff and that of the skill set we look for when recruiting new staff. Addressing the education and training needs of existing staff has required that we challenge our current transportation professionals to incorporate their various specialized transportation disciplines and jointly pursue and produce projects. By collectively using their existing skills, the project teams interact and recognize opportunity from the various modes and disciplines, thereby identifying solutions that go beyond current answers and address future needs. In preparing for this panel, I spoke to several of our transportation practice builders who are currently working with intermodal projects. One of them seemed to put it all together when he stated that what attracted him to come to our firm was the fact that we had all the individual skill sets present, and this afforded him the opportunity to integrate them and offer clients seamless service.

With regard to the skill sets we look for when recruiting new professionals, our base criteria at all levels have included a solid technical background, good people and communication skills, as well as self-confidence and leadership attributes. These have served us well in the past as foundations for future success. Now, however, when we look at technical skills, our focus has shifted from specialized expertise to a more broad-brushed approach. We look for mid- and senior-level professionals with a solid technical background, but we also look for professionals with a big picture orientation, who not only possess an understanding of how the various disciplines and modes interact, but who also have had the opportunity to work on projects where they were interrelated.

At a junior or entry level, we look for college graduates whose curricula provide a solid technical foundation but also blend their exposure to the various transportation modes and disciplines. We prefer graduates who have had some hands-on experience through cooperative programs, internships, or summer work. As with our professional staff, we look for graduates who are well-rounded, demonstrate good people and communication skills, and have been involved in leadership roles, both on and off campus. We view the hiring of our young professionals as an investment in our future and commit to continue their training after they are hired.

We have found some specific activities that are practical and also necessary for both the public and the private sides. Among the most important activities is partnering with education and training institutions, which goes beyond a college recruiting program in which we benefit from the hires to development of a college relations program in which staff get to know the professors and the curriculum, to support the program through scholarships, and to invest time by making people available to go into the classroom and speak from a practitioner standpoint as well as giving professors the opportunity to be on project teams that use their expertise and enable them to interact with practitioners in the field. We have also found that working with colleges to develop cooperative internship opportunities not only benefits the students, but also benefits us, giving us a head start on the recruiting process as we seek new hires.

We have also developed internal programs to meet the unique challenges of training and development. We have an analyst development program that promotes cross-training between the disciplines. We have found that departments of transportation offer wonderful training programs that involve rotating staff among the various departments, and we have enhanced the skills of our young professionals by giving them similar opportunities. Early on, we take our young professionals to client meetings, public hearings, and presentations and make them an integral part of the process. This year we initiated a new program called the self-directed career development program through which our young professionals are encouraged to take senior-level professionals to lunch to discuss career paths. "Senior professional" is rather loosely defined as someone who has either more experience or more responsibility and someone who the young professional feels could offer career guidance and encouragement.

We also offer formal training to help bridge the gap between academia and application. We have young professional training and consultant training to support the transition into the actual consulting side of the business. At the mid- to senior level, we have a project manager certification program that requires participation in numerous company-sponsored training courses. On a more informal level, to ensure that we are on the cutting edge within the different disciplines, we offer brown-bag technical training lunches at which our internal talent is used to present topics. At all levels, we encourage involvement in professional associations, going beyond membership to take leadership roles, making a contribution to the industry itself.

We truly believe that the two most important keys to the firm's future success are to recruit and retain the brightest, most talented individuals. To retain them and continue to have multidisciplined professionals, we must offer personal and professional challenges.

Virginia DeRoze

I would like to talk about a model for building partnerships. I have been in education for 30 years. For the last year and a half, I have been with the Truckload Carriers Association (TCA), which is the association of long-haul trucking companies. I joined TCA at the same time that the association assumed management of the Professional Truck Driver Institute of America (PTDIA), which was formed 12 years ago to advance truck driver training. The people in the industry were unhappy with what was happening in driver training, both within private schools and public schools, and wanted to do something about it. They assembled a group for the purpose of reviewing the DOT standards for entry-level truck driver training, as well as the skill standards. They came out of this meeting and tried to tell the schools what to do. Speaking from the point of view of educators, we do not take well to instructions from a government agency or a certification body saying, "Do this." Educators want to be involved in determining what they will be expected to do.

When I was hired to revitalize PTDIA, I proposed that we not just look at partnerships, but that we develop a stakeholder model including everyone involved in truck driver training: the carriers, the students, the drivers, and the schools. We found at least three other partners as well: the insurance companies, who want quality training to cut down on payment of claims; the regulators, who accredit the private courses and who want to know that what they are licensing is more than a truck driving school advertised on the back of a matchbook cover; and, very important, job-funding organizations. Approximately $2.0 billion goes for training from the Department of Labor alone. Not all of that goes to truck driver training, but the department wanted to know what schools they should actually fund.

We began to work on skill standards as well as communication between education and business. By working on standards, we focused on what it was to be a truck driver. What do you have to know, how well do you have to know it, and what do you have to do to gain those skills? This is what brings stakeholders together.

In February 1997, we had a meeting of high-performing, accident-free drivers. We also got the safety managers involved. We asked them what they were doing now on the basis of what they had learned in previous reviews. They cited several issues, such as fatigue, communication, and customer service, issues not considered in the old standards. We took this information to the schools—85 of them in one room. Private, public, and carrier schools collectively worked on specific operational issues such as what it takes to back a truck, what it takes to couple and uncouple a tractor trailer, and so on. We had a very good facilitator who had worked with the teamsters and labor unions all over the country and who was able to get them to work together on the standards.

We then assembled a smaller group to come up with the actual skill standards, which were announced in October 1997. The next step was to develop a curriculum based on these skill standards. To develop the training process, we matched each skill standard with a portion of a performance-based curriculum. The standards deal with administration, truck safety, record keeping, graduation rates, and employer satisfaction. The employer has to say what he gets out of a particular school.

We also talked to students because this is a facilitative partnership. This evaluation process is a lot like the university accreditation process in which there is a self-study; everybody in the school gets involved and they rate themselves against the standards. We use an educational team that includes not people who do not know about truck driver training, but owners, educators from truck driving training programs, and safety managers. This is the team that evaluates the school.

As a result, each of our stakeholders got something out of this process. The carriers can now go to DOT and demonstrate that (*a*) the industry has taken the initiative and developed the standards and (*b*) the industry cares about the training and certification of these people. The representatives of insurance companies indicated that the standards are exactly what they wanted because they ensure that the drivers are doing what they need to do. We are holding state and regional stakeholder meetings, mirroring what we did nationally in states such as Pennsylvania, Texas, Illinois, and California. Illinois has endorsed the skill standards, and Texas is going to use the standards to certify their schools. The Department of Labor plans to send the skill standards to all the job-funding organizations. In all the different products we have developed, we are able to raise all our skill standards.

In closing, I offer this advice: if you want to get communication going among groups of people, look at what you want the person or group to be able to do, what you want them to be able to know, and get everybody involved. Then you will have communication.

Alberto Santiago

The National Highway Institute (NHI) is a technical training arm of the Federal Highway Administration (FHWA). We have a curriculum of about 120 courses, which is rapidly growing and is going to be in the range of 150 to 160 within the year. We teach courses on topics ranging from civil rights to how to fix a pothole, how to develop and implement ITS, how to build bridges, and so forth. It is very much across-the-board as it relates to highway engineering.

We became an institution through legislation enacted in 1970. Over the past 27 years, we have instructed an estimated 330,000 students. Before ISTEA, the focus was primarily on state departments of transportation. Since ISTEA, we have expanded our customer base to include local governments, private industry, academia, and the international community.

In trying to define what the workforce for the year 2000 is going to be, I came to the conclusion that it is difficult, if not impossible, to come up with a specific set of skills, knowledge, and abilities for the future. Nevertheless, I will try to define four major areas I consider to be the key elements.

One is the effect of technology, about which we have already heard some comments and remarks. Within the context of how technology affects our workforce, the bottom line is that we now have, by far, more knowledge than we can use. For example, we have developed real-time traffic control systems, and we know how to develop superpavements. However, none of that knowledge is reaching the street. We need to be cognizant of and understand how computer technology accelerates the completion of research and that therefore the body of knowledge is going to increase much faster than we are able to adapt it to current practice.

The second area relates to our ignorance, if you will, of what technology transfer is all about and what the components of technology transfer are. We are trying to establish the most efficient, the most productive transportation system, and we need to find the people to be able to make that happen. We need to understand that technology transfer conveys many different scenarios: marketing technology, packaging it the right way for the right customer, technical assistance, training and education, and other components. For the most part, we use training and education programs as a mechanism to convey all of these scenarios—as a marketing tool, as a technical assistance tool, and so forth. The one key ingredient we often forget is what the audience is trying to get and what they need in terms of packaging to make that information something they can use once they get out of these training courses. NHI's training and education programs are highly focused on conveying knowledge, not necessarily on teaching. By the time the students finish the training, they have only been conveyed knowledge; they do not have the experience or expertise to be able to test that knowledge on the job.

The third area is our inability to manage change and technology. What is the human effect of creating change in an organization? Those of you who have gone through reorganizations know about the divergent views when change is brought from the top down versus from the bottom up. This mindset toward change got us into trouble because we brought about change thinking that we were trying to make things better, but the result has been that we are still using the same assumptions we used 20 years ago. As a civil engineer and traffic engineer by profession, it appalls me that we go to the corner on any given street and see a signal control box that by today's standards is almost a supercomputer timing the signal with strategies that we developed in the 1930s.

For the most part, computers are used as a mechanism to convey information, but we need to expand our ability to gain and acquire knowledge by using technology in an intelligent way. When you get new software, how many of you just pull it out of the shrinkwrap, install it, and start playing with it, versus reading the manual and going through the tutorial?

One thing that amazes me tremendously, because of my technical background, is that when new technology is produced and we try to sell it to the practitioner, we do not know as researchers what kind of evidence these people need in order to bring that technology to their practice. The practitioners probably don't know either. Someone has to bridge that gap. We need to understand what makes technology accessible to them and find ways by which they can use it, keeping in mind that in the case of computer technology, it changes every 6 months.

The last area I would like to consider deals with our own approach to training and education. The typical model is to hire an expert, for example, on ITS or pavements, and ask this individual to develop a 3-day course. We have to get out of that paradigm. We need to bring together instructional design people. We need to bring those in adult education together with these experts and package information so that it is amenable to the audience we are targeting. We cannot develop an ITS course and assume that it will be adequate for the diverse community that relates to ITS. We need a short version of that seminar for management so they can get an understanding of what it is and how it may affect their policy and their budgeting process. We need training courses or training initiatives for the engineers involved in design and operation and in the

installation of these systems. We need courses and training initiatives for the technicians who are going to support and maintain this equipment over the long haul, and so on.

We need to revise our definition of training and reinvent the way we go about designing training initiatives. People learn in an estimated 25 different ways, and we need to find a way by which we can reach the critical groups using the right approach.

The approach we use to define competencies is also no longer valid. The definition of "competence" from the instructional side of the house is very different from that of an engineer who is in practice. You must ask that engineer what kind of skills and competencies he or she has versus the type of person they seek to hire. For the most part, the fact that we teach transportation planning, that we teach ITS, that we teach safety, and so on, does not mean that we teach "intermodalism." Our professional culture is one that strives to fight fires but does not strive to invest and make long-term plans to make intermodalism something that can be institutionalized. We need to take more responsibility for what we teach and how we apply what we learn. People will tell you, especially at the local government level, "Don't bore me with the technical details, just tell me how to do it." If you do that, however, the chance of them applying the technology or the expertise is questionable. Nevertheless, that is what the customers want, but then you have to deal with the issue of how to package it so they don't make mistakes when they use the technology.

Besides technical training, we need to provide our workforce with skills to communicate, negotiate, facilitate, perform as a team, and develop comprehensive solutions. By comprehensive, I mean that they meet the requirements not only of what our problems are today, but also of what our problems are going to be tomorrow. Today, we live in an environment of limited resources. If every 5 or 10 years you have to scrap your traffic signals and put up new ones or you need to develop a new system to convey train information to mass transit users, and so on, it is not going to work.

Earlier today we were struggling with the definition of intermodalism and put forth an overall theme of being able to move people and goods. I would like to encourage you to consider that we include moving information as part of that definition.

Summary of Panel Themes

The following themes emerged from the panel discussion:

- Industry change, including technology, downsizing, and process, is having and will continue to have a significant impact on the future workforce, particularly in the mix of skills required to perform jobs.
- Partnering is critical as we look at training opportunities and new skill sets. This means sitting down with our partners as well as other stakeholders.
- In addition to technical skills, it is also imperative that individuals have good communication skills, know how to use technology, and be able to work in a team environment.
- Consideration must be given to nontraditional approaches to training aimed at ensuring that after training and educational programs are over, trainees leave with something they can actually use on the job.

Summary of Dialogue with Audience

Question

Where do panelists see the responsibility for funding the type of training they all feel is essential, or short-term training, which is required if a company is to have a workforce with the skills needed to make these companies as competitive as they can be? We know there are tremendous shortages of people in technologies and communication and in data processing. Some firms fund their own training programs and others obtain it through the NHI, which is funded by FHWA. We have been told there is minimum new funding available for training. Could any of the panelists give us an idea of where and how this is going to be dealt with?

Panel Responses

1. This question goes back to earlier comments about trying to differentiate between education and training. It may not be so much a question of where new money comes from as a question of where current money is being spent. We in industry have been complaining for years, and now some people are listening, about the fact that it is very difficult to train somebody who is not already educated. If they cannot speak and write and read, it is very difficult to provide them with skills training. Industry looks to the formal education system to produce individuals with basic educational skills. We are very willing to take it from there and put up the money for training in the heavy technical areas. We have, in reverse, a similar problem voiced by colleges and universi-

ties, who ask how they can most effectively allocate money within the current curricula. There have been comments this morning about "interdisciplinary warfare" between different departments within a university. We face similar issues in terms of competence. It is easy for us to give money for skills training. It is easy to give money to teach people new technology. On the other hand, it is very difficult to stand in front of my CEO and say we need to put money toward a remedial course to teach people how to read, write, and communicate. Perhaps one of the things we ought to ask ourselves is, "Where is the money going?" We do not expect the colleges and universities to do it all nor do we expect to do it all ourselves. We need to better define our respective roles, then consider where the money comes from and where is it going to flow.

2. If you look at the job training money coming out of the Department of Labor, that money flows to the states and then to the local job training funding sites. Various companies need to go to that job funding site, to the Private Industry Council, to the workforce development group, and say, "This is the type of training we need." Many of these people know little or nothing about transportation training needs.

3. There are also displaced workers, people who had been working and are displaced for a variety of reasons, often a combination of technology and lack of skills. There are also welfare-to-work initiatives. Regarding money to support programs that provided remedial education for people who cannot read and write, I would encourage industry to work with local community colleges. The local community college can package together a program that offers training in technical skills coupled with remedial reading and writing programs.

4. I offer a completely different spin in response to this question. If you follow what is going on with the reauthorization for transportation, there are indications that specific programs are going to be earmarked. It is still too early to say which ones they are going to be, but there is the environment that is willing to accept that as a reality. We, as educators and trainers, have been flawed in our approach to selling our services. There are relatively few organizations in the country that actually bring their human resources directors to the table when they are thinking about long-term strategy, when they are thinking about reorganization, when they are thinking about institutionalizing a change with their organization. Why that is the case, I don't know. The bottom line is that we, as trainers and educators, are not being recognized for what we can offer and, to some extent, what we do best, to influence and help share the ultimate culture of the organization in which we participate. We need to understand and be a part of developing the strategic pathway. We can be engaged when we get ourselves on board, when we can start influencing the direction and the methodology by which changes take place in the institutional life of any kind of business, be it the public sector, the private sector, industry, even academia. We need to play a role in initiating institutional change so that later on, we can say, "Training is one way of conveying this change, but you need to do X, Y, Z as well and understand what the consequences are." Another point I want to make is who attends training today? Often it is the people who are available, not the people who need it. For example, we go out to City X and promote training on how to patch a pothole. People sign up for that course, but when the course comes to an organization, those who are available that day get to attend. They may not be the individuals who actually need the course. We need to work on that to ensure that when we provide the service, it is actually being offered to those who need it rather than just to those available to attend the course.

5. There clearly is a role all of us can play in the business of education and training. Unless you work for a company that understands that an investment must be made in people in order to meet company goals, most of us know that budgets for training are generally the first to be cut. As another panelist mentioned, one of the problems is being invited to the table to talk about the importance of funding for continued learning and development programs; it is a business imperative to make that investment so that in fact the organization meets its goal. There is real work to be done, not only in the human resources community, but also with those line program managers who have responsibility for accomplishing specific business objectives. A report last year by Arthur Andersen & Company discussed the need for an organizational threshold of between 2 and 3 percent of payroll to be invested in education and training for companies. A lot of work needs to be done to meet this funding need.

Question

I have a two-part question. I have been in university education a little over 20 years and do not know any professors of technical communication. Yet I have heard potential employers say, "Your students can't communicate." Certainly I, and others, have tried for over 20 years to figure out what technical communication really means. The first part of my question is, Can you be more specific about what you mean by that? Is it talking in complete sentences, or is it conveying information in front of a group? What is it about communication that you are looking for in terms of skills? The second part of my question is, Have you run across any program at the junior college or university level that seems to be better in teaching skills in technical communication and that could serve as a

model, if you will, for others? I can offer from my own experience what we are now doing. Traditionally, we would send our students out to take a technical communication course in an English Department. They would come back and they could not communicate any better than before. What we have now done is hire a communication specialist specifically for the Engineering School to work with students and faculty and help them learn how to communicate more effectively, to work with the students in putting together presentations. We are trying to do something different, but I am not sure it is going to work any better. Are there other examples you are aware of that seem to be doing a better job?

Panel Responses

1. I commend you on your model. Any time you can get the trainer into the mud, which you are doing, it is going to work. I really feel you will have good results. Faculty and students need to be around technical trainers to hear and get the nuances of all those things.

2. The most important communication skill I find lacking is group presentation. It is becoming more and more a part of the interview process. A colleague of mine who heads a companion group of human resource professionals in the biotech industry reports that they have everyone who comes into their company or who is being considered for employment, regardless of their educational background or level of expertise, give a one-hour presentation to all of the other people within the company. They can use anything they want, but the point they want to convey is that it is not enough to simply do good research. It is not enough to simply be a technical expert. You have to be able to communicate that, starting with your colleagues and ultimately to your customers. This is the place where people who are absolutely brilliant when it comes to technical skills fall right off the track. It does not mean they are any less valuable to the company, except that as smart as you can be, unless you can communicate with your colleagues, you are going to miss out. Most companies today are becoming more and more fussy about who they hire. We do not have a lot of money to spread around to just hire people and hope that sheer mass will do anything from move the freight to get us into the technology future. The key element we are looking for is the ability to stand up there and not only have good ideas but be able to present them to a group. A professor I spoke with recently made that very point. As part of his senior seminar group, he asks his students to select a company to investigate; however, it is no longer enough to write a fancy paper; they also have to present it to the rest of the class. My reaction to that was, "Good for you," because that ultimately is the skill that can make the difference on whether you survive in corporate America today.

Question

You talked about the skills necessary at the corporate level. We are also talking about occupations that are not necessarily at the corporate level. Do any of you want to comment on those communication skills, because I anticipate that you are not talking about requiring the same kind of communication skills of, for example, a truck driver.

Panel Responses

1. We also need to be concerned and/or aware that the environment in which these presentations are being made brings a predetermined set of assumptions; that is, this individual is going to get up in front of the class and talk about the topic of that class, which is going to be driven by jargon. It is going to be driven by a professor who has this engineering background expectancy. You must have data, graphs, and so forth. A lot of money and effort in this regard is directed at engineers, and I put myself into that group. We cannot talk outside our own environment and we cannot write outside our own environment. When I try to speak to an audience that is not in engineering, I cannot use graphs or the same technical jargon I would use with my colleagues and that is a detriment. A second point is that communication skills also include listening skills. How do you deal with jargon? How do you deal with what I consider to be a limiting language? Your definition system may be very different from mine, but we still use them in any kind of conversation. There is no agreement on a universal glossary of what many of these terms mean. Each of us brings to a discussion our own spin and our own vices, which sometimes are explained, but most of the time are not. Another thing I would encourage you to do to make your students more eloquent and more proactive about developing their communication skills is to get them out of the engineering school. Have them make a presentation at their local high school, perhaps in conjunction with a high school career day. Take them out and show them what the other side of engineering looks like—the client-based side of engineering. To the extent that they can begin to understand and develop these other skills, you can begin to institutionalize the skills into courses offered at the second or third year of school. For every course students should be required to make a presentation outside of the immediate class group.

2. It was mentioned earlier that collaborative learning, communication, and ability to be a team player are key el-

ements that, in the last 12 months, have become discriminators, certainly for entry-level people. We do not have infinite resources, and the cost of buying that skill base at the entry level is now approaching about $40,000 a year on the technical side. We are looking for people who know how to communicate and how to be part of a team.

3. With regard to communication, that kind of course needs to be introduced at the high school and middle school levels. With the Transportation Careers Academy Program, our students are involved in public speaking and presentation skills as a part of the courses they are taking. Before coming to the MTA for their internships, they are taken to mock interviews. We have professionals who come out and interview them for real jobs. They are selected from that interview process to come and do internships within the MTA. They are practicing and learning throughout their high school careers to be good public speakers, to make presentations as part of the technology we have put into the classroom to assist them in making and developing multimedia presentations. I think the two students we brought with us, if you were here last night for dinner and for the reading of their essays, are an example of the "product" and skills these students have developed as a result of participating in classes that demand communication and presentation skills. It has to start before you get to the college level, because part of it is the student's own comfort level with being in front of the public and making speeches.

4. I would like to elaborate on what was just said. Thirty years ago I received a Ph.D. and went to teach. Nobody taught me how to teach, but I had the ability to convey the technical knowledge. I do a pretty good job of teaching today, I think, because I have learned how to teach. If you looked at my library 30 years ago and what I have added to it, there is a tremendous amount of material on how to teach, how to communicate. I had an experience when I ran a technology transfer program and asked people to sign their name. We have workers going to workshops who do not know how to write their name. They should have the right to learn the technical information that will help them do a better job. When we think about packaging and learning experiences and skills, we need to carefully assess the receiver and the level. In my job, I need an executive package, a mid-level package, and an entry-level worker package. I had a workshop conference 2 weeks ago. One attendee said, "My boss made me go to this, even though I have been doing this job for 20 years. But, you know, I learned something and I'm really glad he made me come." We need to take more time to consider the attitudes of the receiver and how we package training programs.

5. In addition to universities or high schools preparing students, industry has a responsibility as well. When we go out and recruit on a college campus, the students with the strongest verbal communication skills are going to get our attention first. When we bring them into the company, we used to put them in an office and have them churn out numbers all day. We don't do that as much anymore. We feel responsible for getting them out to start meeting with clients, going to and making presentations. It is amazing to see the early presentations when they are gulping air, so nervous that they can hardly stand it. They are given the opportunity and, as with anything else, with practice you get better. We in industry have a responsibility to create the opportunities so they can hone their communication skills as well as their analytic skills.