ENSURING WORKFORCE SKILLS OF THE FUTURE
THE BIRTH TO WORK PIPELINE

By: Rick Stephens
President – Shared Services Group,
The Boeing Company, Bellevue, Washington
and
Elane V. Scott, Consultant to The Boeing Company

ABSTRACT

This paper provides background and insights, synthesized over eight years, into a complex set of issues affecting industry's looming workforce challenges around the adoption and integration of technology in today's workforce. It provides a perspective on events that shaped current trends, and suggests a new framework for planning.

The workforce that supports a strong and vibrant economy must balance human imagination, natural resources and technology in the creation of products and services that meet rapidly changing commercial, civil and government needs.

As the world grows more complex the challenge of developing the specific capacities and quality of mind needed to bring about this sustainable balance increases. Despite significant and sustained expenditure of government and private resources, and the commitment of nationally recognized organizations and leaders, this balance of imagination, natural resources and technology is far from optimal. Rapidly increasing complexity and dependence on technology, diminishing natural resources, declining student achievement coupled with fewer and fewer young people pursuing critical and creative technical careers is creating not a future labor shortage but a future skills shortage.

The current and projected decrease of creative and technically competent professionals, coupled with the "graying" of the current technical workforce has far reaching systemic implications. At risk are the individual lives of today's children, the future workforce. In a larger context this risk threatens the fabric that weaves our social, economic and national security. Failure to nurture and develop specific capacities in today's children, capacities that can intelligently meet current and future needs directly affects all aspects of our society and every segment of society must take an active role in meeting this fundamental challenge. It is no longer acceptable to put in place programs like the H-1B Visa program that temporarily meet national workforce needs. Nor is it acceptable to place disproportionate blame and responsibility on our educational systems.

We live and interact in a large, complex global environment. The quality of thinking and creative action needed to thrive in this environment must match the complexity and interdependent nature of the environment. Never before have so many people, entire families, companies, communities, corporations, states and nations, been challenged to apply long term, integrated systems thinking to their daily lives. This quality of mind involves new levels of communication, shared vision, collective intelligence and direct coherent action by all stakeholders: government, education, business, media, health industries, community, family and individual parents, caregivers and children. Only with shared vision, personal involvement and the creative intelligence of all stakeholders can we develop the strategies, systems, approaches and applied resources to meet the demands of our increasingly complex and challenging global community.

It is vital that industry, media, government, health and education leaders come together as never before. They must share their best thinking around the idea that family, community, education, and workforce function as integral parts of a broader human developmental system.

Based on a whole "system" view, this paper describes key perspectives and behaviors that must occur before a long term systemic change can take place in today's overall workforce development process.

Key elements include a) an expanded role and greater visibility of leaders, b) leveraging the value and importance of media to impact culture and future workforce trends, and c) alignment of seemingly independent actions currently underway by industry, society and the government.

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INTRODUCTION

At a major aerospace industry technical conference in fall 2000 attendees learned that industry and global economic well-being could be impacted by a shortage of qualified people. The shortage, however, was not limited to technical capability, but was also concerned with the lack of key systems integration thinking skills necessary to respond to the complex issues faced on a national and global basis.

For the aerospace industry, specific skill shortages were further defined in a study by the Defense Science Board and Air Force Scientific Advisory Board as program management, systems engineering, and the ability to bring together technically diverse disciplines and put in place important business relationships to develop aerospace products and services. These skills are developed through experience. Further research showed that aerospace was not unique. The same set of skills shortages exists in other technology based industries, globally. While the United States is not alone in its workforce needs, it cannot afford to wait on a plan.

Considering the present aging workforce, and that the potential workers for 2010 are in middle school today, a different discussion about the continued economic viability of American industry is needed now. There are some segments of industry where 15% of the workforce is eligible to retire now with an additional 25% eligible to retire within five years. Thus with the dwindling numbers of students (both in terms of percentages and quantity choosing technical fields of study), and the likely losses of experienced workers in the not too distant future, technology based industries will find themselves competing with a large number of markets for an alarmingly smaller number of qualified future employees.

Response to recent workforce shortages during the dot-com era led some commercial industry leaders to decide to import needed talent through the H-1B Visa program. While this was structured as a short-term solution, long term, it has proven to be shortsighted. International crises, and movement, called "brain currents" and "brain drain" of many of these workers back to their native countries, created unintended consequences including creation of new competition. Those entrepreneurs, however, have not been immune from the same problems, with a shortfall of qualified workers surfacing for them as well.

Industry must now look at a long-term view of how to support the growth and development of workers, beginning with unprecedented actions to support tomorrow's workforce at a very early age. The future workforce will need knowledge, capability and skills to operate and respond to a global marketplace.

Key questions to keep in mind as you read this paper are therefore:

1. Can industry take the risk that market demand alone will drive enough people to pursue technology-oriented careers?
2. Are today's approaches to developing tomorrow's workforce of sufficient scope and intensity for meeting future workforce needs locally and globally?

BACKGROUND

The US economy and our national defense have traditionally expected industry to be robust and forward thinking in order to meet national needs and spur development of new commercial products and services. Increased velocity in technology development, however, along with dramatic shifts in consumer and military market demands for products and services, and competitive challenges in a global market have all magnified the need for a sophisticated, technically talented, and business savvy workforce. But whose job is it to develop such a workforce?

Human development of this magnitude does not happen overnight, nor in selective locations. Rather is the result of diverse activities taken on by a large group of stakeholders in continuously evolving environments. State and local governments, social services, educational institutions, industry, professional organizations, parents, students, publishers, the media and many others, (as stakeholders) all have vested interests and important roles to play in human development and therefore in eventual workforce readiness. Those roles and actions play out over a period of nearly two decades as children are transformed into capable, intelligent, creative human beings who are well grounded in academic skills, citizenship requirements, and employability and work readiness skills.

The US education budget for 2004 will be in excess of $530B. These dollars are, so most

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business people believe, aimed at helping to meet workforce and citizenship preparedness objectives. The view of educators about their obligation to prepare students for the workplace reveals a different perspective. Educators routinely state that their role is to prepare citizens first, not workers. Is preparing students for citizenship sufficient to assure their individual economic self-sufficiency as well? This difference in views may be part of what has led to the crisis industries are facing today. What is the role of education and what is the role of industry in preparing tomorrow's workforce? Why does the historic education view persist?

There is not, that we know of, a collaborative, shared view between the major institutions, economic sectors, and stakeholders who are concerned with human development, about who is responsible for the different stages of birth to maturity development and what the desired outcomes look like. Old views of separate responsibilities and outcomes prevail.

According to the Bureau of Labor Statistics the fastest growing occupations through 2008 will be in technology and information management. Given the speed at which technology is advancing and new communication devices are connecting the world, is content driven education enough to prepare students for the realities of the technically dynamic workplace? Richard Judy of the Discovery Institute predicts that 60 percent of future jobs will require training that 20 percent of the current workforce possesses. Where will the leadership come from to help develop an integrated view of how to develop talent, among the institutions that impact workforce readiness?

- According to Science and Engineering data from NASA, between 1998 and 2008 there will be 1.9 million new jobs in Science and Engineering
- There will be 198,000 college graduates per year to fill those needs.
- But, during that same period 2 million S&E workers are expected to retire, resulting in a short fall of more than 2 million workers.

Because the workforce pipeline is in fact students in the K-12 education system today, current metrics paint a disturbing picture relative to meeting this need. "On the National Assessment of Educational Progress, administered in 2000, 34% of all white fourth-graders demonstrated grade-level proficiency while only 5% of black fourth-graders and 10% of Latino fourth-graders did so." -Los *Angeles Times, "4th, 8th Grades Still Come Up Short in Math" August 3, 2001* "…

Only 26% of fourth graders and 27% of eighth-graders achieved proficiency [in math], according to the 2000 test results. Only 17% of 12th graders were judged proficient."

"From 1992 to 2002, the average reading scores for fourth graders on the National Assessment of Educational Progress, known as the nation's report card, remained flat. The average score for top students increased while the average score for the bottom students declined even more significantly…Two thirds of students tested fell below the level the federal government considers proficient, and 37 percent fell below even basic knowledge of reading, meaning they could read little beyond simple words and sentences and could not draw conclusions from what they read…The gap between the very top and very bottom levels widened in all racial and ethnic groups." *-The New York Times, "Gap Between Best and Worst Widens on U.S. Reading Test" April 7, 2001*

"New census figures show the United States if relying more than ever on the skills of foreign-born scientists and engineers. Yet the number of foreigners coming to work in those fields has recently plummeted – and Americans are not rushing in to fill the gap, according to a report from the National Science Board.

If those trends continue, it warns, the nation will find itself unable to compete with growing economies such as China and India for the brainpower needed to remain a world leader in science and technology." – *Mercury News, "Panel: U.S. Science Leadership at Risk" December 2, 2003*

At a Town Hall luncheon in Los Angeles, California on April 11, 2003, Federal Secretary of Education Rod Paige said that average reading scores for fourth graders in the US have remained flat since the report "A Nation at Risk" was published in 1984. There has been no measurable improvement in 20 years.

Technology firms are creating and evolving in a completely new work environment. In the case of the aerospace industry the cold war is over, but the war for talent is just beginning. This message was, and remains a wake up call. The future world of work is uncertain and changing daily. There is no body of content that can be taught today to prepare students to solve problems not yet defined. If excellence in talent

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in the future workforce will be defined not by memorized data and information, but rather, by capacity and capability (driven by imagination, innovation, and creative intelligence), more must be done to ensure proper brain development early. The cost for amending this lost opportunity grows as young minds grow, and is becoming nearly prohibitive for businesses to fix when new hires enter the workplace without requisite capabilities for creativity and innovation on the job, long the hallmarks of industry.

The other question this raises is if this trend is so pervasive, how then, did most all of us fail to see it coming? We create and operate some of the most sophisticated technological, communication systems hardware ever developed by humankind to advance personal communications, defense, and consumer sales. But we failed to perceive the need to change the way people are prepared to live and work in the present and future economy that resulted.

One event that has stood out as being significant was a seemingly overnight, cultural shift that flip-flopped family lifestyles from rural to urban in just ten years between 1945 and 1955. It was such a major social shift that it impacted how we learned and worked from then on. Only recently have we begun to consider the magnitude of that change.

In 1967, the first high school graduating class of America's Baby Boomers turned student achievement downward, in spite of the fact that previous generations had continued to register improvement during a depression and two world wars. According to research psychologist Dr. Stephen Glenn, commissioned by Presidents Johnson, Nixon, Reagan and Carter to study the factors around the decline in educational success of America's youth, this statistic was unsettling. Considering the advantages the Baby Boomers had been afforded in their youth, it would seem that they should have achieved a higher level of academic success, not lower. This pointed to a radical cultural change despite improvement of their overall economic situation.

Dr. Glenn reported that before WWII the American public was 70% rural and 30% urban. Family networks were strong and communities were built around common concerns. Neighbors shared a common language for success and values.

At the end of the war, 12,000,000 people (6 million soldiers and 6 million women who had been working in the factories) found themselves with a choice to go back to the farm or stay in the urban areas that would become our metropolitan cities. They decided to stay in the cities.

An additional 5 million couples joined those already there, which radically changed the fabric of America's society. In a decade this country turned itself upside down and became 70% urban and 30% rural. Strong family networks and small community support systems dissolved and a completely new environment and value set for young people was born. The children's presence in the family was no longer an economic necessity. Their role transitioned from being an asset and contributor on the farm to them having significant free time and in many cases no responsibility for adding to the family income. This radically different social structure altered dramatically children's sense of place, worth, and purpose. Their feeling of belonging, what we call bonding, diminished.

Research has since shown us that bonding, one's sense of place and purpose, provides the "context" for learning and performance. By altering this context we altered the social foundation for learning. But we didn't know it then and are just beginning to appreciate it now.

Simultaneously television was introduced. It delivered information using concrete images (pictures) rather than symbols and metaphors (words) and brought about a devolutionary step in terms of brain development and complexity. The brain systems that process pictures are different systems than those that process abstract symbols and metaphors.

These two factors: (1) radical changes in the social environment, bonding, belonging, family and (2) inventing a concrete rather than an abstract delivery system for information, represent what many are now recognizing as root causes for our collapse of educability. *And these unprecedented forces reshaped our nation's culture in less than a generation. These forces are presently impacting the cultures of nations around the world who are being impacted by mass marketing for the first time.*

The prosperity of the past 50 years helped economic standards and expectations to rise, but the fabric of our society changed dramatically. We failed as a collective body to appreciate how

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these cultural changes were impacting a) **the developing brain** and its capacity for critical and creative thinking, so vital to industry and business today and b) and **the cohesiveness of the social infrastructure**, that promoted a sense of purpose and value. In other words, we didn't connect how these cultural changes influenced practical changes in how we worked and related to each other. Media culture became our culture.

How deeply have these changes impacted learning and performance? Belonging, place and purpose, early language development, and imagination, are top predictors of future forms of critical and creative thinking. Both are severely undermined by the current environment, for all demographic profiles. In 1950 the average American teen had a spoken vocabulary of 25,000 words. Today the average is less than 10,000 words.

In the last few decades advanced brain research has revealed that the environment and the brain are two sides of a vast, complex and dynamic system. Human development is "experience dependent." Experiences with the world alter the brain's structure, chemistry, and genetic expression throughout life. It is the direct experience of the social environment, of which culture and schooling are part, which sculpt the developing brain and thus take advantage of the potential defined by the DNA. DNA is potential, not prescription.

The sensory stimulation from media sources, interactions with people and environment that the brain receives during its most sensitive periods of development determines the nature and quality of the capacities that unfold. In suggesting, "imagination is more important than knowledge," ***Einstein advocated a shift of priorities from the accumulation of information to capacity building. This shift of priority, we believe, is essential, and must be cultural, if it is to make a meaningful difference.***

Understanding this central point creates the bridge between early childhood development and workforce development. To have sustainable impact, the whole child/youth development cycle must be considered along with higher education. Education, media, and community constitute a system of influences in developing minds.

Today's businesses are facing a dizzying array of changes that demand the capacity to respond to uncertainty. Traditional views of child development and education are no longer adequate or relevant to those who must think about the future workforce. Innovation and creativity are <u>the</u> essential keys to present and future workforce excellence, but they are capacities, not content. Like all other capacities, innovation and creativity, innate in form, they must be developed if they are to be of any use. ***No one can be conditioned to be creative. Creativity and innovative thinking require experience and practice and are difficult to test.***

The capacity to imagine, that is to create mental images not present to the sensory system, is <u>the</u> capacity upon which all later forms of critical and creative thinking depend. Developing the capacity to imagine, vital to all subsequent forms of critical and creative thinking, demands a complex integration of neural processes in the developing brain. Concrete pictures, computer graphics, photographs and television fail to bring about this integration. Appreciating this distinction and its impact on early brain development is critical. All too often, because these tools are mistakenly thought of as "technology", their use by students is pointed to as technology training. Unfortunately, this faulty thinking leads teachers and learners away from the value of personal and group experiences as being critical to enhanced learning capability. Hands on and team learning are critical to developing the skills of the future workforce.

The ability to work with uncertainty is not a content issue. Assessment testing can measure data and skill but not capacity, imagination and creativity. For a successful future society and workforce, priority must be given to those activities that facilitate greater capacity building first, to be able to respond to uncertainty, beginning very early in life. There are no jobs that require constant test taking as a requisite skill in today's business environment. There are no jobs in today's business environment that don't require constant creativity and innovation because of the continuous expansion of applied technology.

In the aerospace industry when quality was a major focus, it was concluded some time ago that quality was not a small "q" but a large "Q" issue. Many things impact quality, including requirements, definition, and design. Well before the real quality of the end product can be assessed, those processes impact production where measurement occurs. The same is true in education and workforce development. The formal educational process or small "e" shares

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some responsibility for developing the workforce of the future, but not all.

We concluded that all the stakeholders listed earlier impact big "E" and must be engaged in workforce development. Because of what we know about systems and how they function, we believe our traditional response in industry has been too limited and our focus too narrow. Industry needs to do much more than give dollars and demand better results. Industry needs to take a leadership role in helping facilitate changes in the overall (Big E) education process, which includes the larger social and culture environment that we now know shapes the developing brain and its behaviors in a variety of ways. We have systems integration skills and capabilities that can help in ways more dramatic than dollars.

A New Perspective

The challenge of future workforce education is more than ensuring the delivery of content driven programs at the right time. There must be students with the desire to participate. Available data indicates there are enough students in the pipeline and sufficient workers available to meet the demands of the growing employment base. Statistics such as academic performance and career track selections, however, indicate that they are not strongly interested in the fields where there is a great demand and economic opportunity. In fact, in some cases there is even a decline in interest, in spite of greater promise for income, especially among women and minorities.

This raises the question of what else is impacting their perspectives, attitudes and beliefs such that they do not attend programs aimed at their long-term prosperity and meeting industry needs? The institution that business and society in general usually look to, to forge our children's views about career, schools, have significantly less of our student's time (12%) than we generally perceive, and therefore less impact than we would like to think.

Statistical studies and polls show that students are being influenced most in their career choices by media and by their peers. This is where they look to create their own culture, one that today does not provide the same drive and motivation to work in the technology based industries as the one that many of us who work in the industry today grew up in. Consider recently the example of a new television series called CSI (Crime Scene Investigation) that sent the number of applications to forensics programs soaring in the last two years.

There are some industries where people currently employed by that industry have discouraged their own children from going into the business. This raises the question about where to begin reaching out? Mass marketers recognized the opportunity to capitalize on a $200+ billion teenage market opportunity, and by using CD's, music, video, etc moved to capture that market. Some studies show that teenagers today see over 3,000 advertisements a day. Flyers retrieved from backpacks are insufficient competition for parents' and students' attention, must less motivation.

Results of Actions Taken Thus Far

A current, executive summary of discussions, small gatherings, think-tank style meetings, and educational summits in the US and Europe, involving a few thousand stakeholders, highlights seven shared values (or imperatives) that emerged repeatedly from all those we talked

A corresponding set of 4 action steps, described further in the paper, was then applied. These steps are familiar to program managers and leaders in industries where systems thinking is central to the success of large scale change, whether cultural or program driven.

A systems approach is not aimed at consolidating under one organization the thousands of actions underway in the areas of education and workforce development. Rather the goal is to provide a strategy and template to ensure that all stakeholders operate in a much more integrated and cohesive way at both local and global levels. Aerospace is the most consistent user of this process.

Integrated Stakeholder Action Imperatives:

The seven imperatives or shared values necessary for ensuring that stakeholders are prepared to work as a team in developing the workforce needed to meet future aerospace requirements are:

1. **Think differently about communication**. Devices AND messages are important. People must know how to use devices, but they must also know how to create and tell positive stories about the industry and its people, or the devices cease to be relevant.

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2. **Recognize the future workforce as a valid, common purpose for moving forward together**. A bright, technically advanced workforce is imperative for a secure homeland in the broadest sense.

3. **Operate as integrated stakeholders rather than stakeholders managing independent programs.** Leveraging resources is key to sustainable success.

4. **Define our own motivations and purpose for being engaged**. Better utilizations of resources, students with a greater capacity to learn, having a greater impact are all valid motivations.

5. **Seek to better understand the relationship between young people and the media messages that influence them**. What stories are youth listening to now? Who is telling them? What are their motives? Do students know the difference between manipulation and information?

6. **Ensure all of the stakeholders participate**.

7. **Actions need to impact youngsters throughout their development**, beginning early in their lifetime.

Those seven imperatives (or shared values) provide the foundation for three key actions that have the potential for fundamental change in the development of both citizens and the future workforce.

Four Key Action Plan Steps

1. Communicate and Align the Leadership – As in all large scale systems integration activities, alignment of the leadership is key to achieving an agreed to vision, expectations for the involved stakeholders, setting the framework for allocation of resources, establishment of respective roles and responsibilities, and defines key stakeholder interfaces. Thus communication with stakeholder leaders concerning what is now known about the current status of education, the developing brain, and workforce readiness, using a common language and data, is key.

2. Help people recognize that in a new economy old words can have new, even very different meanings, depending on who is using them. "Communication" in the tele-communications industry can refer to laying the pipelines that carry ones and zeros from point A to point B. To others it means creating the message. Both are correct, but different, depending on which part of the company you work in.

On a program level, leaders need to align their respective organization resources (both financial and human) to ensure knowledge development and outreach actions are strategically integrated and aligned within the organization, as well as the community, where the organization does business. This includes expanding the view of community outreach beyond dispensing funds.

3. Collaborate with Media – Work with those involved in preparing and delivering media messages internally. In communities where companies do business they need to understand the significance of media stories and the ways they:

a. Shape public perceptions and impact culture. Work with the media to share more about what leaders know when it comes to solving problems and ways to move an organization forward. This builds a common knowledge base and a culture receptive to technology careers.

b. Steer students toward activities and experiences that allow them to become media producers, not just consumers. Embed student reporters in classrooms and work places, not just as passive observers, but active storytellers, capable of reporting what they see and believe to be true. Science and scientists are usually portrayed as evil, corrupt or mad in film and TV stories. Who better than the young people to write and tell a different story and hear them?

c. Impact community understanding of the technology based industries, key issues, and opportunities in the job market through stories in unconventional channels. An example is collaboration with other trade media such as education publications, to swap stories with industry trade magazines.

Transformation leaders take at face value the importance of aligning with customers, the leadership team, and employees, and put in place strong communication plans to support that action. The transformation in workforce development requires the same action, but with an expanded view of a more pervasive media base.

4. Integrate Stakeholder Programs and Activities–With a vision in place and stakeholders aligned to meet that vision, the next

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major step is to begin focusing stakeholder actions on that vision, not as individual organizations, but as elements working as part of an integrated system.

Across local, regional, state, and national levels there are thousands of programs focused on helping youngsters be successful at all stages of their lives… from pre-K readiness through post secondary education. Programs span a wide range from learning new skills to social interaction. However, surveys show that few of the programs are aligned, few work together, and even within specific stakeholder organizations, programs overlap and/or fail to know about each other's existence and miss opportunities to leverage and maximize potential. Thus stakeholders (including their leaders) need to:

a. Identify and support existing programs that meet long-term workforce needs.

b. Support programs that include participants from across many stakeholder groups.

c. Ensure that related programs are well defined, supported, and aligned, so that as youngsters move from program to program they continuously build skills and capabilities.

SYSTEMS INTEGRATION THINKING

The future success of industries' abilities to support a strong and vibrant economy is dependent on having a workforce with the desire, capacity and capability to translate technology into products and services that meet commercial, civil and government needs. Based on current trends, achieving this objective necessitates re-evaluation of the process for nurturing future workers. Though our present educational system has existed for over 50 years, we recognize that working in separate institutions and competing for dollars is no longer productive. The activities and actions of many stakeholders outside the field of education have significant impact on student perspectives, attitudes, and thus behaviors toward pursuing technically oriented careers.

Clearly, the responsibility for creating and implementing such a change does not rest solely with educators (little e), but with all stakeholders (Big E). The role of the industry leadership is to bring the competency, capacity, and motivation to facilitate the change.

Can this really happen? The challenge in any cultural change is reaching agreement that the current state needs to be changed, describing a common vision of what the future state looks like, agreeing on the process for achieving that future state, aligning respective roles and with an understanding of the availability of resources, align them.

Those who have not been involved in broad cultural change often have a conditioned consumer market response to this problem: they expect instant solutions. Next steps are supposed to be laid out for them because the thinking has been done by experts and the answer is neatly packaged. All they have left is to go do. We don't have that luxury any more.

The answers we seek must be born out of the thinking of all of us. We are all experts in our respective areas, but we must have many stakeholders included in our workforce conversation. More than 200 meetings with individuals and organizations in the US and abroad have assured us that everyone wants to play. But pulling key players together is a messy, time consuming process. Even so, if we don't have time to do it right, when will we have time to do it over?

Those who have been through a culture change in the business environment recognize that what is needed in a broad national system is complex. Those in the aerospace industry are coming to realize they possess a set of tools in their industry that can be applied to facilitate system change outside aerospace. Thus the thinking and set of tools that got us to the moon can lead us to the future.

SUMMARY

Industry is facing a critical juncture as many of its seasoned and skilled workforce prepare for retirement, with insufficient numbers of workers with needed capabilities in the wings. And, because the overall educational system (Big E) is not fully aligned to deliver people to the future workforce equipped with the capabilities of innovative and creative thinking, and desire, the aerospace industry, along with other technically based industries, must begin to take on our share of the responsibility to make this happen.

It must consider active and engaged involvement in working with other stakeholders to change the current education and workforce development system. Leaders must learn a new language and become more personally involved in

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understanding not only the challenges, but become engaged with stakeholders outside of their industry. Those involved in leading change must recognize the impact media has on cultural transformation and work with the media to help shape and craft the messages that will motivate students to more readily pursue the "cool" opportunities of technology based industries.

Further, the issue is not that there are not many, many activities aimed at exciting students, supporting teachers, or developing innovative, standards based curriculum. What is needed is a top-level systems architecture for aligning and integrating programs and activities. Currently, many programs, while tactically focused, fail to address strategic intents and needs and the industry finds itself failing to find people with the right skill sets. The issue is not the quantity of people, but rather lack of available qualified people, nearby.

The time for a broad group of stakeholder involvement to impact a cultural change is now. The developmental social systems that support our economic well-being are faltering, with many blaming the educational system. Yet, from the time a child is born to the time they graduate from high school, students generally spend less than 12% of their time in school. Arguably, students can spend as much as 25% of their time sleeping, but 63% percent of their time is involved in other activities. While this is not meant to diminish the substantial impact schools have on student learning, it does mean that school alone is not solely responsible for the projected workforce problem, nor is it the only answer.

Similar workforce crises in the past have involved the viability of individual companies. Today's crisis involves the viability of entire industries. In response, no one company can solve this problem. It will take all of us. What we can and must do is use the capabilities of systems integrators to facilitate relationships with all stakeholders that will create the changes necessary all across the country, if we are to sustain industries that are fundamental to the quality, lifestyle and security we all enjoy.

And, if one industry, legendary for large scale programs, with the most sophisticated tools in the world for large scale systems change, is not among the key stakeholders to step up and help lead this critical change in perspective and action, then who should? If aerospace businesses do not set an example to all institutions to bring the best of what they know about how to solve large-scale problems, whose should start? If the time to begin the messy, time-consuming process of working together across stakeholder groups is not now, when will it be right?

So, tell us, what stakeholder group do you belong to? How are you affecting the quality of tomorrow's workforce?

Contact Information:

Rick Stephens
President – Shared Services Group
The Boeing Company
Telephone: 425-865-4800
Email: rick.stephens@boeing.com

Elane V Scott
Consultant to The Boeing Company
Future Workforce Education Initiatives
Telephone: 562-754-5413
Email: elane.v.scott@boeing.com

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