Strategy Forum on Global Learning

April 2-4, 2002

Wichita State University

Report

Introduction

In 1999 The Boeing Company, hereafter referred to as Boeing, made an endowment of $1.5 M to Wichita State University to hire a Professor of Global Learning and begin a Global Learning Program that both meets the needs of Boeing and its global workforce and allows Wichita State University to enter the global learning arena.

Background

The following section presents information about Boeing, Wichita State University and Global Learning that supplies background for this forum.

Growth

Both Wichita State University and Boeing have the goal of sustained growth. The types of growth for each are different. Boeing is a for-profit company with shareholders, while Wichita State University is a state-funded university charged with providing university education and research for its various constituents, including the Boeing Company.

Growth for Boeing means increasing annual profit and consequently its share price in the stock market. The nature of Boeing's business causes it to experience extreme fluctuations in its profitability and stock price. For as long as its primary business activity remains the manufacturing of aircraft, the company is prone to variations in demand for aircraft and the fortunes of the commercial airlines and needs of the military. Boeing desires a stable pattern of growth. The path away from experiencing further fluctuations involves diversification, and the company has begun to diversify through acquisitions and internal developments. Its developing strength in satellite communication is a good example. This venture has implications for areas such as air traffic control management systems and access to broadband Internet by passengers.

For Wichita State University, its ranking as a research university is important. Indexes such as the Carnegie Ranking are important measures of its overall quality and quantity of research. Equally important for a university is its growth in credit hours or the number of students and the number of hours they are studying courses and programs at Wichita State University.

Here the emphasis for Wichita State University is on growth of credit hours in its teaching programs. That is not to say that research is any less important. In fact there can be growth in research associated with credit hour growth due to the requirement for some research and development for teaching innovation. Like many Universities that have formerly depended on their local catchments for students, Wichita State University continues to look further afield. It has done this in the recent past, in that a significant proportion of its students do come from overseas. However, recent events have led to a reduction in the number of people traveling, chiefly by air, internationally and domestically.

There is some concern whether this situation will turn around. Tightened security and its attendant inconvenience along with anticipated increases in the cost of air travel due to lower volumes may see people demanding to study in their home countries. The maturation of institutions of higher education in many developing countries also decreases the need for some students (favored by their universities due to religion or ethnicity) to travel overseas to study. Taken in combination, these factors will contribute to a sustained decline in growth of credit hours through international students traveling to Wichita. Consequently, Wichita State University needs another way to reach them.

An emerging avenue for credit hour growth is global learning. Global learning refers to the provision of learning with modern communication technologies and includes all the synchronous and asynchronous activities that feature in the traditional classroom-based study program. The enabling communication technologies that underpin global learning have matured to the point of being more reliable and stable than just a few years ago. Earlier attempts at global learning were fraught with technical breakdowns and other difficulties. In addition, the bandwidth of the Internet has steadily increased, although it is still not good enough for widespread use of combined video, audio and data communication. Even Internet 2 is destined to clog up once many people start using video/audio/data transfer.

Global Learning

Global learning allows virtual classrooms to be operated with students and faculty who are both widely separated. This type of education provides an opportunity for credit hour growth. In a world where universities and other providers are in competition, there will be less need for the current geographical distribution of institutions. The corollary of credit hour growth through global learning with students outside the traditional geographic catchment is that students will have a much wider choice of where to study. This is a serious issue. Any university that does not develop strategies to grow through global learning may face extinction.

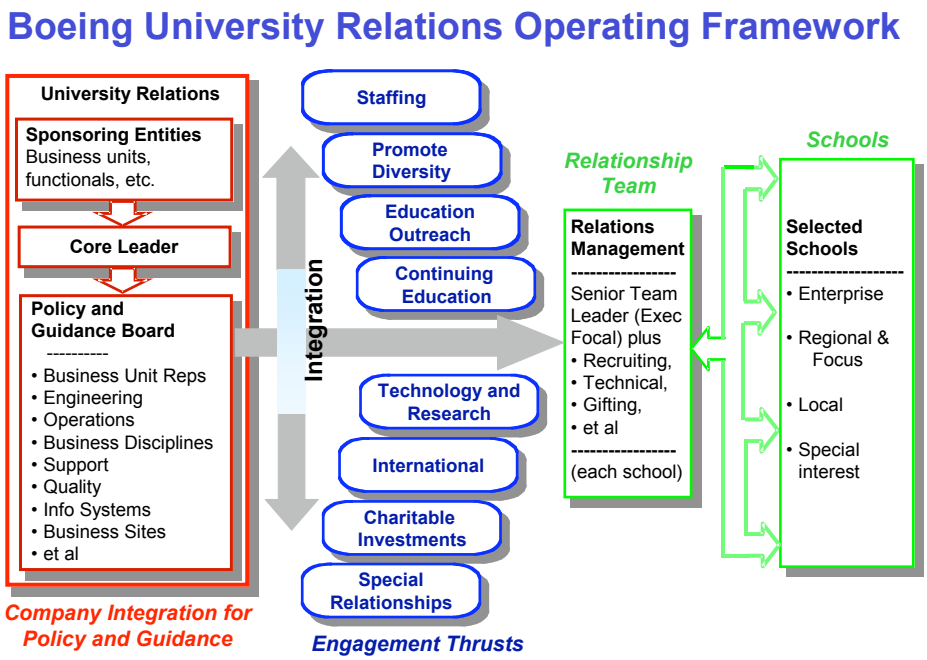
Two features of global learning that students will look for are (1) breadth of disciplines covered, including integration among them, and (2) the quality of the learning experience. The latter can be further divided into two more factors. The first factor is the quality of communication technologies. For students to experience a rich array of educational activities, communication with peers and faculty is vital. The second factor that contributes to the quality of the learning experience is the diversity of perspectives on a topic to which the learners are exposed. This is especially important for virtual classes that comprise learners from different countries, whose cultures, languages and perspectives differ.

Challenges

Thus, both the Boeing Company and Wichita State University face significant challenges. Boeing needs to build on its current strengths and be prepared to diversify to create a buffer against economic and geopolitical cycles and the consequences of their downturns for business stability. Universities are about to go through an unprecedented cycle of

reinvention, selection, partnering and extinction. Wichita State University is among them. Procrastination now will be fatal.

Pursuit of growth and diversification for Boeing will require changes to structures, processes, the mix of business enterprises and a good deal of research and development. As a global company it is inextricably intertwined with many other companies and institutional partners. Very little of any significance in the future will be accomplished on a solitary basis. It is time to think freshly about Boeing, its partnership with Wichita State University and Global Learning.



Global Trends

An emerging global pattern is the formation of university consortia or clusters that exhibit synergies through complementarities of strengths and cultural diversity. An example is Universitas 21. This group of universities around the world will behave in the manner of a trading block like the EU (European Union) conferring advantages for its members and making it a formidable competitive entity for remaining, individual universities. Another emerging trend is the formation of strong and exclusive business partnerships with global corporations. For example, Universitas 21 has partnered with Thompson Publishing. This confers many advantages related to ownership of content, ability to publish and in the delivery of global learning. The latter is aided by the ownership of WebCT by Thompson Publishing. WebCT is one of two major resources for delivery of learning on the World Wide Web. The other is Blackboard.

Boeing's Strengths

One of Boeing's strengths for global learning is its communication infrastructure and the company's presence in many countries. It is likely that as the Internet and even Internet 2 becomes saturated with global learning traffic Boeing's internal network will provide an opportunity for growth. If a portion of Boeing's internal communications network were dedicated to supporting global learning, then it would have at its disposal a means of generating new revenues. At the same time, in partnership with a consortium of universities, it could become part of an important provider of global learning content and perspectives as in the Universitas 21 example.

Already, as part of the Connex project, there is the potential to raise revenue through provision of seat arm Internet access for passengers. Taken one step further, Connex could be leveraged to provide the opportunity for passengers to participate in global learning classes while airborne. In fact, the desire to study during the many hours that passengers are traveling internationally could boost revenues from this new business initiative. However, as indicated earlier, this approach alone could run into difficulties if we face a sustained, worldwide decline in air travel. Something more is needed.

The global learning program, a partnership between Boeing and Wichita State University, aims to meet the internal global learning needs of Boeing through provision of classes to Boeing employees around the globe. Both their needs and the chance to make additional revenue are available by using part of the internal Boeing communication system to provide learning for employees and external customers.

Pitfalls

As mentioned above, there is an emerging trend comprising the formation of international university consortia with global corporate partners. For the universities involved in these, a consortium provides an opportunity for credit hour growth and for the global corporations, like Boeing, it provides a new business opportunity. Some consortia have failed. Two important lessons can be learned from observation of those failures.

The first lesson is that there must be an advantage in forming a consortium of universities for its members. There must be complementarity of strengths or cultural background to provide synergy. Consortia, such as the Western Governor's University have failed to prosper because its members have little complementarity and remain competitors. For students, there is no advantage in pursuing a program brokered by the consortium over simply dealing with one of the member universities. The ideal global university consortium will offer a wide range of courses and be able to offer multiple cultural perspectives on each of those courses. Graduates from the consortia will be global graduates ready to face the challenges of working in global industries.

The second lesson concerns the nature of the universities involved. Three attributes are essential for success. First, the universities as content providers must have strength in research. This underpins high quality course content, innovative educational strategy and global perspective. That is why many purely for-profit "dot.com" ventures have failed to break even let alone grow. Their content stagnates due to the lack of a research base.

The second attribute is educational strategy. Even with an outstanding international standing as a research university, attempts at growing credit hours in the global learning sphere will also fail if the quality of educational strategy in courses is lacking. A recent report in the Chronicle for Higher Education indicates that top research universities have reformed the quality of their teaching programs only after severe criticism by the Boyer Report.

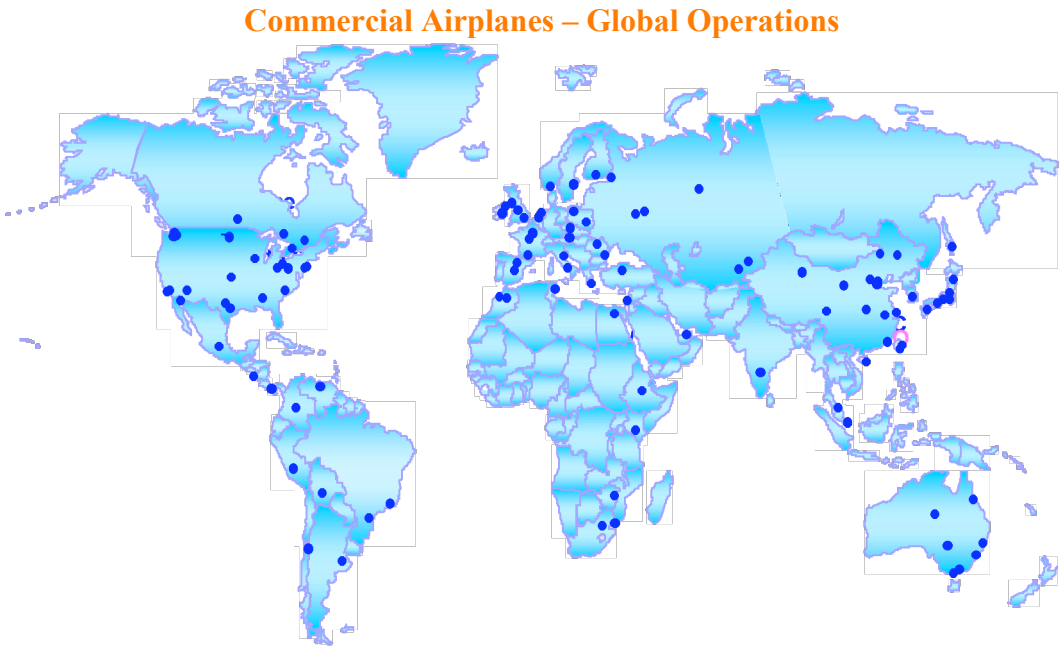
Finally even with the first two attributes, the absence of a global perspective means such universities may be viewed as imperialistic by potential foreign students. Universities that lack focus on diversity of cultures, language and perspectives can really only ever serve as a traditional catchment of students and hence face extinction.

Growth for Boeing

Overall growth for the Boeing Company can be divided into growth of its core businesses and growth of its new business enterprises. Core businesses can grow through adoption of more efficient processes, practices and structures. Associated with these there will often be adoption of new, enabling technologies. Like other large global corporations, Boeing needs to be continually reviewing and improving its core businesses.

Boeing's new business enterprises are the result of either internal innovations or acquisitions. Ideally, new businesses should do more than add to overall profit. Strategic selection of new business enterprises can lead to a multiplier effect through synergies with core businesses. For example, acquisition of communications companies has

allowed Boeing to operate more efficiently at a global level through round the clock design work on new products.



A possible scenario for Boeing is to leverage its global communications infrastructure and presence in more than 50 countries to generate revenues from provision of dedicated bandwidth for global learning exclusively to its consortium of preferred universities. Such a venture would allow Boeing employees to access a full range of courses from anywhere in the world and so would better meet its professional development needs. At the same time, revenues from charges for the use of dedicated bandwidth would allow learners anywhere in the world to take courses from the global university consortium. Taken together, the combination of dedicated communications bandwidth and a comprehensive array of courses will ensure a significant advantage over competing consortia.

Demand for Global Learning

Demand for this type of "product", global learning, is driven by a number of factors. As mentioned above, a sustained decline in international travel will mean that people want to study from their home country. However, they may not be able to study at a local university for a number of reasons not the least of which is that many developing nations simply do not have the capacity in their higher education systems. In addition, local universities that depend solely on their local catchment will not be delivering what global employers want—a global graduate. A diversity of peer learners and faculty is needed. Developing nations, such as China and India are rapidly becoming more affluent and

need more graduates for their work forces. Globalization of their businesses, too, is inescapable.

Participants & Schedule

Clockwise from right of screen: Deborah Taylor, Bob Waner, Jan Wilmott, Bill (Steve) Randolph, Peter Zoller, Doug Serrill, Marvis Lary, Anna Anderson, Frank Hughes, Don Malzahn, Phil Gaunt, Ian Gibson.

Participants

Boeing

Mr. Bob Waner, Director of Engineering, Commercial Aircraft, Wichita

Mr. Frank Hughes, Manager, University Relations, Chicago

Mr. Jan Wilmott, Director, Executive Learning, Leadership Cntr, St Louis

Mr. Doug Serrill, Chief Engineer for Wings, Seattle

Mr. Bill Randolph, 777 Program Engineer, Seattle

Wichita State University

Dr. Gerald Graham, R. P. Clinton Distinguished Professor of Business, Convenor

Dr. Glyn Rimmington, Boeing Distinguished Professor of Global Learning

Dr. Peter Zoller, Associate Vice President, Academic Affairs & CIO

Dr. John Beehler, Dean, W. Frank Barton School of Business

Dr. Ravi Pendse, CISCO Fellow & Professor of Electrical Engineering

Clockwise from bottom left: Ian Gibson, Jan Wilmott (just in shot) Bill (Steve) Randolph, Peter Zoller, Doug Serrill, Marvis Lary, Anna Anderson, John Beehler, Ravi Pendse, Frank Hughes, Don Malzahn, Phil Gaunt.

Schedule

Tuesday, April 2nd

Orientation and tour of National Institute of Aviation Research and College of Engineering facilities.

Wednesday, April 3rd

Review of objectives, brainstorming and identification of two major issues: Global Partnerships and the Global Employee.

Thursday, April 4th

Presentation of results to the Faculty Advisory Council on Global Learning.

Goals

An important goal of the Strategy Forum on Global Learning is to better align the expectations of both Wichita State University and the Boeing Company in this area. This would be achieved by agreeing to common goals, formulating strategies for achieving them, and finally devising a follow-up work plan. Achieving an alignment of expectations involved establishing a better understanding of our respective organizations. The process involved brainstorming, working groups, and a review by the Faculty Advisory Council on Global Learning.

Discussion

5-10 Years into the Future

Our first task was to project into the future five to ten years and think about education, industry and going global. A picture of how things might be five to ten years from now could then guide the formulation of new goals, strategies and work plans for both WSU and Boeing. For instance, imagining what a student will need to know will help shape the future of universities, just as a picture of what an air traveler will want, will help shape a future Boeing. We should consider what some of the underpinning features of the future will be.

Communication

A significant feature of the future is one in which communication systems allow people to work and learn in environments that are truly global. A variety of communication media are anticipated to make global learning feasible. Communication may be person-machine, person-person, person-group and group-group. Examples of media include DVDs, CD-ROMs, electronic books, interactive television, online chat and conferences, video and audio, to name a few. Others, unimagined at present, may emerge. These are the media, but what of the nature of future learning that they facilitate?

Learning Partnerships and Life-Long Learning

Partnerships between industry and education will be important in this picture of future learning. The partnership would be a learning relationship, since neither partner knows exactly what the future will look like. Fine-tuning our adaptation to the changing landscape necessitates a learning approach. Often, new approaches will have to be tried, but by working in partnerships, the risk can be shared and minimized through close monitoring and agreed decision points. The learning partnership approach would be mirrored in the transformation to life-long learning among employees.

It is agreed that there will be less emphasis on a fixed, initial qualification and increased emphasis on a life-long learning process. This emphasis would not come after basic training, but would need to be integrated into it as preparation. Part of the early learning

activities must be about learning itself. This is called metacognitive development. Further, education needs to be adapted to the needs of employees, who must become life-long learners.

The "atoms" of learning, as it applies in life-long learning, will need to change from courses, within programs, to smaller chunks that can achieve a learning outcome within small periods of time, such as two hours. Learners will need to have personal (mirroring official) tracking systems, so they can "see" where they are in the learning landscape. To some extent this will be possible with solitary learning, but may be more awkward in group learning, such as with a social constructivist pedagogy (Driscoll 1994). The latter is necessary for higher order learning that involves multiple intelligences (Gardner 1983). For example, mathematics/logic intelligence can be developed as a solitary activity, but if it is needed in combination with teamwork and its associated communication processes, then interpersonal intelligence will be important. For the educator this will mean much more sophisticated approaches to learner management. For example, when people learn in teams, there will be optimal cohorts of peer learners. To build these, educators (and learners) will need to know a lot more about individual learners' preferred learning styles, strengths and weaknesses, and complementarities.

Need for Growth

There is one common feature of the future of both Boeing and WSU. That is the desire, if not imperative, for sustained growth. For Boeing it is growth in profit, product turnover and increased share value. For WSU it is growth in credit hours. Among the outcomes for Boeing are products that better meet the customers' needs and hence bigger market share. The outcome for WSU is providing a learning environment that meets the learners' changing needs. In both cases, the customer and learner are global in nature. Boeing already operates and thinks across national borders. WSU does some of the same. Some important clues for how to accomplish growth will come from considering who our audiences are.

Both Boeing and WSU have a multiplicity of audiences to serve. For Boeing these include employees, shareholders, airline companies, input stream manufacturers, air travelers, defense and nations. For WSU, they are students, researchers, sponsors, employers of future graduates, industry partners, university partners, taxpayers and the government. Sometimes the needs or desires of different audiences will conflict. For example, air travelers want cheap, safe and convenient travel, while airlines want profitability. Employers may want graduates with new skills, but universities cannot bare the full risk of developing new courses without some assurance of there being enough students to fill them. In some cases, our audiences overlap.

The future and current Boeing employee constitutes a shared audience. The former, students of basic programs, want to be assured that they will be attractive to global companies, such as Boeing, when they complete their program. The latter would like continued employment with Boeing or, even better, to remain attractive in the open market by being up to date. Customers of airlines, air travelers, may also overlap in that they also want to remain attractive in the open employment market place, or operate

prosperous businesses if they are self-employed. The latter represent a huge potential new audience for Boeing and WSU, along with other preferred universities, if they were to operate in partnership.

Boeing's Internal Needs

As Boeing continues to become more global it needs to be successful in setting up additional centers in other countries. Its first experience has been with the design center in Moscow. Various, unanticipated difficulties were encountered. Boeing would like to learn from this so that future establishment of centers in other places will occur more smoothly. Boeing, in partnership with its WSU-led consortium of preferred universities, can better prepare existing Boeing employees for this process. In addition, there needs to be a strategy for helping the local, new employees understand and adapt to Boeing's culture and way of doing business. In all of this, though, there needs to be scope for absorbing of cultural differences that confer unanticipated advantages. Boeing wants to become like Nestlé. Nestlé is a Swiss company, but locals in its various countries of operation think it is actually local.

Education Opportunities?

There are different models for funded employee education. On the one hand a global company may insist that employees pursue programs that relate to the companies needs. Funding for other learning activities, under this scheme, would not be supported. Boeing, with is Learning Together program takes the view that any educational programs will raise the intellectual capital of the company. Directed approaches toward funded employee education tend not to work. Participation may be discouraged, or worse, employees may go through the motions, but not try and their lack of effort costs the company. A hands-off approach encourages entrepreneurial spirit.

There is a need to use the same approach when interacting with locals for the first time; otherwise opportunities for entrepreneurial development may be lost. Some differences in approach to business exhibited by locals, while they may not be compatible, initially, may translate into advantages later. Boeing has active programs for establishing a new Boeing culture, a common culture, across employees from the old Boeing and its new acquisitions. This is occurring at the executive and management levels. At other levels there are courses given by Boeing Learning Centers, which cover internal issues and there is the Learning Together Program.

At all levels there will be a need to understand and adapt or adapt to different cultures so that dealing with them translates into an advantage for Boeing. Boeing employees may need an incentive to learn what they need to know to work in other cultures.

Boeing employees, like many other workers, look for education that is convenient and Universities need to cater to their needs. Timing and location are important. The pedagogical approach needs to cater for varied learning styles and constraints to which employees are subject.

It is important to consider what the Boeing Leadership Center covers. The Center runs short, intensive, residential courses for executives and managers within Boeing. Customers and input providers can also attend. There is a Global Leadership program that includes a six-month visit to a country. Participants undergo extensive briefing on topics such as local labor practices. Online courses are provided. During earlier executive courses, an introductory role-playing exercise is provided to simulate traveling to a foreign country and negotiating a new agreement.

During the Moscow design center development, use of modern communications media, such as interactive television, sped up the process.

There is a need for a set of protocols and procedures for further developing the global learning initiative between Boeing and Wichita State University.

Boeing faces the challenge of assimilating itself into new countries. This will happen through assimilation of some of its people. In the future, Boeing employees, including executives and managers, will be natives of many countries. Typically, they will speak several languages and have a thorough understanding of different cultures. This understanding will be sufficient to allow smooth implementation of projects within the Boeing.

The global transformation process can best be accomplished through a "pincer" movement that involves the most senior and the most junior people in the company. The senior executives must embrace and facilitate the change. Newly recruited employees will be selected on the basis of "global" attributes and newer employees will be provided with opportunities to also gain these attributes. Gradually, the pincer tightens until it reaches the middle ranks of the company. Succession planning that favors global savvy and similar new selection criteria for recruitment will render impotent the diminishing number of recalcitrant employees.

Global Partnerships

It is clear that Boeing cannot achieve this transformation in isolation. It will best be done in partnership with its preferred universities, who can fulfill the required professional development needs of Boeing.

After the experience of establishing the design center in Moscow, the question is what can be learned from that so that establishment of future centers in other places can proceed more rapidly and smoothly. A global partnership between Boeing and its preferred universities is needed. A first step will be a detailed study of the Moscow example followed by formulation of education programs that will allow Boeing employees to adopt certain strategies—termed strategic content—and then apply this to acquisition of the required cultural content.

Implementation of a global learning partnership will require development and use of agreed protocols, small steps and strategic thinking.

If we examine partnerships in general, it is possible to discern three main types: alliances, joint ventures and mergers (Baer *et al.* 2002). Each has a different level of associated financial and academic risk. Choosing whether to partner with another organization is a matter of balancing the risks against the potential return on investment. Sometimes the anticipated return has to extend "outside the square" to new markets or, in the words of Christensen (1997), be "disruptive". Learning partnerships may be disruptive when the market lies outside the mainstream. A partnership between Boeing and its preferred universities could reach a new, unsatisfied category of learner and thus be disruptive. For both potential partners this represents an incursion into unfamiliar territory and needs to happen quickly to be truly disruptive.

Before embarking on any partnership, it is worth assessing the readiness of the prospective partners. Baer *et al*. (2002) propose eight criteria for this assessment. Unless these are satisfied, a partnership is fraught with difficulties and ultimate failure.

1. *A need for the proposed innovation has been identified*
2. *The relevant leadership is committed to the process*
3. *The partners have an e-commerce strategy*
4. *The partners have an international strategy that emphasizes lifelong learning*
5. *The partners have identified crucial industries to preserve and foster*
6. *There are incentives in place to encourage cooperation across all systems*
7. *There are sufficient resources committed to the proposed innovation*
8. *There is a commitment to learner-centered education.*

Boeing needs to end up with a globally oriented executive, management and workforce through a process of flexible, global learning. Wichita State University and the other preferred universities need to grow credit hours and will have saturated their local catchments with traditional learning approaches. Meeting Boeings' internal needs and being disruptive by meeting the needs of an emerging third-party group of learners can help accomplish this growth. However, Boeing also needs to grow its overall business. The disruption can occur through the combination of learning provided by the universities and the access to dedicated international bandwidth. It would be disruptive, because it allows global reach that will not be available to users of the Internet or even Internet2.

The Global Learning Strategy Forum seeks to explore these needs and explain them sufficiently well for the leadership of both the universities and Boeing to understand and commit to an outcome. One of the difficulties faced by people outside Boeing is its internal complexity. Among the questions faced is the issue of compatibility of the proposition with existing structures and processes.

The means to raise revenue from this initiative will come from an integrated e-commerce and e-learning approach. Learners want a seamless online environment so they can go from identifying a course or program that satisfies their needs to enrolling, studying and graduating. An important feature of the e-commerce strategy will be stability and reliability of the communications infrastructure, something that would arise from the use of the Boeing internal communications infrastructure.

The proposed initiative is both international and able fulfill the unmet need for access to lifelong learning by Boeing employees and third parties. The concentration on learner needs both in terms of development and delivery of programs is a fundamental feature of the approach being proposed here. The industry partner to be enhanced here is clearly Boeing, whose communications infrastructure would be critical to its success and disruptiveness.

The institutional and company level incentives of overall growth need to be translated into incentives for the key participants to cooperate rather than compete. These incentives can take a number of forms. In addition, the necessary resources for such collaboration need to be put in place. A great deal of attention needs to be paid to the people charged with implementation of cooperation so the partners can continue to learn and grow.

If we assume that the partners are ready, then it is important for both Boeing and the universities to work towards an outcome in which either a new enterprise is spun off or the partnership elements are embedded into their respective organizations. These are preferable possibilities compared with a global learning partnership being merely another appendage.

An emerging international trend is the development of clusters among universities themselves. Sometimes this is formal in nature and at the university level. Other times it is informal and based on personal links at the department or discipline level. The latter are generally more successful than the former. The former are seen as imposed from above, whereas the latter are spontaneous. Universities need to take a leaf from the GE book and follow Jack Welch's lead. That is to listen to the people closest to the coalface. By facilitating and supporting international partnerships at the faculty level, universities can come of age in the international arena.

A barrier to this process is the fear of being taken advantage of, a concern more prevalent at the administrative level than at the faculty level. Generally, faculty have built the social capital needed through sustained reciprocity of favors. The best principle is to devise win-win situations. For example, if half a dozen faculty in a discipline area are all over worked and each recognizes the others' strengths, while acknowledging their respective weak areas, then together, they can convene a better course, than they could individually. At the same time, their respective students receive input from five other faculty, who may each vary in the way they approach the course topic. Plus, if the students work in multinational teams, they learn even more from each other. Everyone wins.

University faculty and administrators, who are impatient and see such relationships as opportunities for exploitation, will quickly become isolated in the international community. The growth that universities need for credit hours will come after the quality of courses has been built up, as described above. Without quality, they will become yet another dot.com failure. Once prospective students realize what a university that is part of an international network can offer, they will gravitate away from the traditional university. Put bluntly, universities that do not immediately start collaborating with other

universities to form international networks, have little or no future. So, the path to success for universities has two stages and stage one cannot be skipped. First the quality of courses has to be established, then new students will enroll and credit hours will grow.

Given that growing numbers of such international networks are already developing and will be in competition, some additional advantage has to be sought. This is where partnerships with global corporations, such as Boeing, will be essential. The industrial partner will benefit through tailored courses and programs that meet their worldwide intellectual capital development. They may even be able to grow revenues by selling some advantage to the university network, such as access to superior bandwidth. This, in turn, provides the university network with the competitive advantage that it needs.

Boeing needs to be aware of these trends and to think beyond individual university-plant relations because such thinking is limited. Boeing needs to make sure its educational needs are met globally as it becomes a more globally oriented business.

The Global Graduate

Both Boeing and the Accreditation Board for Engineering and Technology (ABET) have articulated the characteristics of the desirable engineering graduate. These are core attributes that every engineer should have. However, without some additional non-core attributes, global companies, such as Boeing, will be shortchanged. The pace of development in aviation is such that Boeing employees need to continue learning new things throughout their career. So graduates need the skills and understanding required to continue learning. They must learn about learning, but not only that, they must become masters of learning. Engineering graduates need to be aware of how they learn or in other words what their preferred learning style profile looks like. This is also an important tool for educators, who have to devise courses for people with varying learning styles. There are few significant challenges faced by engineers that can be tackled by individuals.

Teamwork is needed. Teamwork can only successful if it builds on the two intelligences (Gardner 1983) of self-knowledge and interpersonal knowledge. New tools are needed that allow engineering graduates to articulate their characteristics as team members. Specialists in organizational psychology, such as Belbin (1993) have devised profiling methods that allow individuals to know their strengths or preferences when working in a team. Belbin's philosophy is to build on strengths rather than trying to overcome weaknesses that can be balanced by other team members, who have a complementary profile. "Nobody can be perfect, but a team can be."

Communication is critical and even more so in the context of a global company. Within one plant with a diversity of people in different areas, there is an abundance of scope for misunderstanding. The electrical engineer may use terms that have a totally different meaning for an aerospace engineer or an MBA or a machinist. This challenge increases exponentially when one superimposes the cultural differences brought by people from different countries working together. A cardinal rule of communication is "never blame the listener" (Mackay 1994). The onus is on the speaker or writer "to get inside the head

of the listener" and look out at the world. The speaker or writer must develop the listener's perspective. But to do so is impossible in its entirety, since the listener's perspective is the result of a lifelong accumulation of experiences in contexts that may be unattainable to the person trying to communicate. The challenge for educators of the global engineering graduate is to discover a means to help the student change his or her perspective.

In addition to core attributes, superior teamwork and communication, a student must be able to work and communicate well with people from diverse backgrounds. However, this cannot be taught. Attempt to do so will result in students knowing *about* other cultures, third hand. Experiential learning is needed for students to construct, deconstruct and reconstruct multiple foreign perspectives.

Some might argue that the diversely populated campuses we see in many universities provide the solution. Others may add that integrated exchange opportunities will be all that is needed. While these will help, we have to bear in mind the enculturation that goes on in such instances. International students absorb the local culture without realizing it and often without critical appraisal. Before long they are interacting with local students as chimera. Similarly, exchange students "fit in" to their new environment so they can get on with the process of study. Both these situations do hold some value for producing the global graduate. But we can add to these the opportunity of direct interaction, with less enculturation effect by taking advantage of modern communication media such as interactive television, email, chat rooms and threaded discussion systems.

By exposing students to students and faculty from different cultures during a program, we can help the students construct an understanding of many different perspectives based on those different cultures. Part of this process will be aided by learning new languages, learning about their own history from multiple perspectives (e.g. Zinn 2001) as well as the history and geography, both physical and social, of other countries. Again, the key will be to have available a set of tools that accelerate the process, as it does with learning styles or team role profiling. To some extent a set of parameters for "understanding" the cultural perspective of another country can be assembled and applied. A systems approach is needed with this complex challenge, just as it is needed to build a new aircraft.

Boeing has the power and the resources to catalyze the formation of a partner, an international university network that can make possible this process of producing the global graduate. Specific challenges need to be articulated and these need to be communicated to the universities. Remember not to blame the listener. Universities need to be given the help they need to facilitate global learning.

The global engineering graduate will be someone, who is an excellent engineer in the technical sense. However, when faced with the task of working in a team comprising other engineers from around the world, the new engineers will be able to ascend the learning curve more efficiently than the ordinary graduate. Their command of multiple languages the experience they have built up during their program through membership of

a diverse student body, both local and global and their work in teams with people from many backgrounds will give them the required advantage.

During the new engineering programs that feature global learning, the performance of students will have been measured using an assessment process that puts more emphasis on how well they have come up to speed with communication and team work in a multicultural context. Equally, faculty performance in this context will feature the addition of how well they (the faculty) facilitate global learning. Rewards will be needed for steering students away from the hurdle of enthnocentrism or cultural imperialism toward cultural relativism and equity of perspectives.

The precise nature of these new assessment practices and evaluation of educational approaches has yet to be determined. The general direction has been proposed. As described in earlier discussion, a learning partnership between educational institutions and employers of their graduates is needed. This is not only because of the scope of the challenge but also because of its dynamic nature. Gaining a global perspective for this decade is likely to be of limited value in the next decade, just as trying to understand the 1990s from a 1960's perspective is all but intractable.

Another way to view this challenge is to use the metaphor of genetics and evolution. Engineers can be viewed as having a population of tools available to them for application to a population of new problems. The problems keep changing, just like the environment, the climate and the soil or ocean waters. To cope with the ever-changing population of problems to be solved, the engineer's tools need to change, and this change could be seen as evolutionary. Any subsequent population of tools is the result of variation and selection of previous generations of tool populations. Continuing viability of the world's food crops depends on the available variation to counter variation in populations of disease organisms. If this genetic diversity and variation of food crops runs out, the world is in trouble. Equally, if we limit the diversity of tools available to engineers, solutions to new problems may never be reached or at least the time to reach a solution will grow. A source of diversity and variation lies in the perspectives and backgrounds of people from different cultures. For engineering-based companies like Boeing to prosper, they need a vast "gene pool" of tools and these tools need to be continually "evolving" through variation and selection. Limiting or homogenizing the available set of cultural perspectives that can give rise to novel engineering solutions may be a grave mistake.

Some of the foregoing discussion is reflected in the "5 Cs" articulated by Chairman Condit:

1. **C**ost
2. **C**ollaboration
3. **C**ommunication
4. **C**ontinuing Learning
5. **C**ontinuous Improvement

Some thoughts on how to achieve the goal of producing the global graduate are that we should map out strategies for the next five years. A first step is to establish an ongoing dialog between representatives of Boeing and its twenty-two key university partners. Among the possible strategies are changes to recruitment and advancement of faculty, transformation of courses and programs, emphasis on team teaching across partner universities, improved (learner) cohort management to take into account learning styles and exposure to diverse cultures and a mix of on-campus diversity, exchange and use of modern communication for direct global learning. A significant challenge will be that of changing basic attitudes among the faculty and students, who are not yet in the global context.

Many of the strategies employed by Boeing's Leadership Center will be useful for producing the global graduate. The BLC uses a network approach in relation to teams of faculty drawn from across the company. It uses cohort management to select and monitor productive combinations of learners. Any global learning initiative between Boeing as a whole and its partner universities needs to be integrated with the activities of the BLC. This will take advantage of many synergies between the two.

General Discussion

As we proceed, we need to identify and adopt strategies for obtaining a global perspective. This applies to employees, faculty and students. We need to articulate what being a global graduate or global employee means. Describing the global graduate or global employee has to be done sufficiently well that we can measure whether this goal has been met. Representatives of both Boeing and the universities need further discussion to come up with measurable goals. Once this is done, a baseline has to be established so we can see whether we are making progress. The expectations of Boeing and the universities may initially be quite different, but through dialog, convergence should be possible. If not, universities will not have been able to meet Boeing's (or other global company's) needs. Measurement needs to occur at different points in the development sequence, from the beginning of higher education programs through to feedback from employers.

Eventually, the results of this exercise should translate into new accreditation criteria for ABET. Alternatively, an additional accreditation body needs to be established for those institutions wishing to be recognized as producing global graduates. This is important for both the student and the student's future employer.

For Boeing it will be important to gather intelligence on what its competitors are doing in the area of global educational partnerships. This could yield useful information, if the competitors have already made moves in this direction. Another view of competition is that which will occur between university clusters, irrespective of their industry partners. Clearly, selecting the right partner, be they industrial or university cluster, will be critical in terms of the benefits flowing from the relationship.

There is much to be learned about global partnerships from the experience of setting up the design center in Moscow. Dealing with the things that went well as well as went wrong will yield useful information. We should aim to analyze this as global partners.

Review

The forum was joined by members of the Global Learning Faculty Advisory Council. It comprised Drs. Ian Gibson (Education) Don Malzahn (Engineering) Marvis Lary (Health Professions) Philip Gaunt (Liberal Arts & Science) and Peter Zoller (Associate Vice President of Academic Affairs). The Senior Vice President of International Banking at Intrust Bank, Anna Anderson, also attended. The Forum members presented the results of their deliberations for feedback from these invitees. This section of the forum was divided into two parts, one concerning Global Partnerships and the other concerning the Global Graduate.

Global Learning fits into Vision 2016 for Boeing. That year marks Boeing's centenary. Boeing employs approximately 200,000 people, worldwide. After September 11th the workforce was reduced by approximately 20,000 or 10%. Boeing is reinventing itself through a process of globalization. Its presence in Asia, Europe and the Pacific will be strengthened. Partnerships are being formed with customer countries. 63% of purchases from Boeing are from outside the US. Therefore partnerships are necessary. For example, without a partnership in Russia, imported Boeing products would be subject to a 60% trade tariff. At present some 4% of Boeing employees are based offshore and this is set to increase, as it has with GE or GM to 20% or more. This will mean fewer jobs with one global company in places like Wichita, but if other global companies are attracted to the same location, other jobs will emerge. For Boeing to be truly global, executives in overseas countries need to be local. This confers local "ownership, a sense of autonomy and takes advantage of local knowledge. Like GE, Boeing is diversifying to dampen the effects of geopolitical and economic fluctuations, such as that which occurred after September 11th. These changes are happening quickly, and education needs to keep up with or ahead of industry in relation to globalization.

Boeing needs and has assembled a consortium of key university partners. These universities will need to transform their courses and programs to meet the needs of Boeing and other global companies. This transformation will need to be comprehensive, so students have gained sufficient experience interacting with other students and faculty from widely varied cultures. Just as Boeing's customers have choice, students can choose where to "buy" their education. Those universities offering global learning will have an advantage over their competitors.

Recommendations

Discussions at the Forum converged on two areas: global partnerships and the global employee/graduate. The latter is concerned with the desired profile of future graduates and employees of Boeing and other global companies. The former focuses on the short term and aims to help Boeing with its establishment of further centers like the Design Center in Moscow.

The Global Employee

Forum participants recommended that the concept of the global employee be discussed with Deans, Chairs, faculty councils and other stakeholders with a view to incorporating the relevant attributes into accreditation criteria, such as those for ABET. Through continued dialog, a set of attributes that constitute being a "global graduate" would be compiled for review by a future forum. Of particular interest is how attainment of these attributes can be measured.

An online forum (see gl.wichita.edu) will be established with a view to having faculty, Boeing representatives and other global company representatives derive a list of attributes that constitute being "global". A workable set of attributes will need to be agreed upon. Then metrics of the degree of attainment of those attributes will need to be developed and agreed. A study should begin whereby the metrics are applied to "non-global" courses to obtain baseline measurements. Subsequent measurements can then be made for instances where courses or programs are adapted to incorporate global learning. These will need to be correlated with reflective feedback from both the "non-global" and "global" employees and their employees. Once a clear link has been established, some standards can be set and then incorporated into the accreditation requirements of organizations such as ABET (Accreditation Board for Engineering & Technology).

Global Partnerships

The transformation of courses and programs provided by the preferred universities of Boeing will take a number of years. In the interim, Boeing wishes to establish more centers, like the Design Center in Moscow, but it wishes to be more able to deal with cultural and other local issues, efficiently and quickly. At the same time, universities feature specialists in an array of different cultures, who can provide consultancy and development to help Boeing achieve this objective.

Boeing employees in one country need a fast track to understanding the cultures, languages, ethics and business practices of other countries. At the same time, they need to blend this with their understanding of the Boeing culture.

A first step for Boeing is for those people involved in the development of the Moscow Design Center to review any notes and work journals from that project, both local and visiting workers. At the same time, Wichita State University should assess its existing capability to deliver courses or programs that will help learn from the Moscow experience and prepare Boeing employees for future developments. On this basis, a proposal should be developed for a Boeing – Wichita State University partnership.

The following steps are suggested:

1. Review Moscow experience
2. Assess capability within WSU to study the Moscow experience
3. Develop a proposal for a learning partnership
4. Review proposal
5. Develop business arrangement

6. Conduct pilot program
7. Revisit/Improve
8. Develop production implementation plan

Ideally, WSU needs access to insights derived by the Boeing people involved in the Moscow Design Center development. This includes problems encountered, gaps in knowledge, cultural differences, sources of misunderstandings and a wish list arising from the Moscow experience. Some indication needs to be provided on potential projects in other countries, so WSU can prepare a demonstration program that will prepare Boeing teams for a new situation.

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