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# How to Connect the Americas: An IS/IT Academic Research Plan for Tomorrow

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## ABSTRACT

During the last decade we have engaged in several heretofore separate and at least initially, somewhat independent research initiatives: 1) Virtual teams and collaborative technologies [Ballantine, Becker, et. al.; 1999], [Becker, Ballantine, et. al., 1999, 2001], [Becker; 2003], [Becker and Cline; 2005]; 2) building bridges between researchers across the borders of the Americas [Becker and Sanchez; 2006, 2007, and 2008]; and 3) analyzing the dramatic and alarming declines in IS/IT majors [Becker, Hassan, and Naumann, 2006]. Within the last few years we have come to discover that these research streams appear to be converging in a welcome and pleasantly synergistic manner. When combined these research streams result in an action plan to utilize a combination of virtual collaborative technologies and face-to-face interactions with faculty and students throughout the Americas to increase the number of IS/IT majors at all educational levels: undergraduate, masters and doctoral degrees. This paper describes what brought us to this epiphany and my plan for the next year-long phase of this study, which will commence in summer 2009 for this author. A partial list of the planned activities, objectives and metrics are shown in Appendix 1

## Keywords

Americas, research plan, IT/IS enrollments, virtual teams, distance learning, collaborative technologies, cross-cultural

## INTRODUCTION

At the outset let me formally acknowledge the support and encouragement of several colleagues, without whom the current research project would not be possible: Aurora Sanchez, Guillermo Rodriguez Abitia, Jerry Luftman, Ali Montizami, Martin Santana, and Rodger Ballantine. Their names will be formally acknowledged as co-authors in future articles when their direct involvements and specific contributions to future research findings can be properly identified. Furthermore, they should not be blamed for any fault in this proposed research plan.

That said, it appears that several of our heretofore separate research initiatives, during the past decade, are converging synergistically now. One research stream involved several grant-related studies to examine the present state-of-the art application of Virtual Teams in organizations. A second research stream pertained to developing cross-border university level classes and collaborative research among faculty within the Americas, especially in the Information Technology and Information Systems (IS/IT) field. Finally, a third research stream involved assessing and solving the nationwide and worldwide downturns in undergraduate and graduate enrollments in science, technology, engineering, and mathematics, the so-called, STEM-related fields, with a special emphasis on information systems and information technology majors. When combined the research streams turn into a plan to utilize a combination of virtual collaborative technologies and face-to-face interactions with faculty and students throughout the Americas to increase the number of IS/IT majors at all educational levels: undergraduate, masters and doctoral degrees. A description of the three individual research streams follows next. Appendix 1 provides a sample list of a few of the already initiated and planned activities for 2008-2009.

## VIRTUAL TEAMS AND COLLABORATIVE TECHNOLOGIES (VT/CT)

Our research during 1998-2005 explored the use of collaborative tools for enhancing virtual team effectiveness [Ballantine, Becker, et. al.; 1999], [Becker, Ballantine, et. al., 1999, 2001], [Becker; 2003], [Becker and Cline; 2005]; also, [Grants: Becker, et. al.; 1998, 1999-2000, and 2001- 2002]. Our findings identified a fairly well defined set of the most popular and useful collaborative tools (e.g., Email, audio conferencing, mobile communication and computing devices, meeting scheduling, and project management tools) that were in wide-spread use. Some organizations were found to be highly effective with the use of these collaborative tools, while other organizations had more highly

developed, team-related cultures. Furthermore, over the time period (1998-2003), there appeared to be increasing levels of team virtualization, both in terms of the level of virtual tools usage and virtual teaming effectiveness.

Applying these tools to both the academic and business environments in the course of this study will help validate early research findings, as well as, provide an assessment of the readiness of current institutions for virtual collaborative readiness, and in particular distance learning.

### **AMCIS CONFERENCE -- CONNECTING THE AMERICAS RESEARCH TRACK**

In 2005, we were asked to develop a new track for our Americas Conference on Information Systems (AMCIS), known as the Connecting the Americas minitrack [Becker and Sanchez, 2006]. This effort was later bolstered by several leaders in our field, who were equally dismayed by the paucity of cross-cultural teaching and research within the IS/IT field, who participated on panels discussing these concerns [Becker and Sanchez; 2007, 2008]. These academic leaders included:

1. Dr. Guillermo Rodríguez Abitia; Co-Chair, AMCIS 2006 Acapulco; Director del Centro de Desarrollo de Tecnologías de Información y Electrónica; Tecnológico de Monterrey, Campus Estado de México;
2. Jerry Luftman; Chair, AMCIS 2004 New York; Associate Dean, Distinguished Professor; Stevens Institute of Technology; School of Technology Management; Hoboken, NJ 07030;
3. Ali R. Montazemi, Ph.D.; Co-Chair, AMCIS 2008 Toronto; Professor of Information Systems; DeGroot School of Business; McMaster University; Hamilton, ON L8S 4M4, Canada;
4. Martín Santana, Ph.D.; Co-Chair, AMCIS 2010 Lima; Director del Programa MBA; Profesor de Tecnología de Información; Universidad ESAN; Monterrico Surco, Lima 33, Perú; and
5. Co-track Chairperson: Aurora Sanchez O, Ph.D.; Associate Professor; Director, Centro de Investigación en Gestión de Tecnología para la Empresa; Universidad Católica del Norte; Antofagasta, Chile

Each of us has had the privilege of Chairing the Americas Conference on Information Systems and hosting it in our respective cities. During the last two years we have conducted a panel at the AMCIS conference [Becker, Sanchez, et. al., 2007, 2008], where we have discussed the causes for this lack of research and teaching collaboration. Among the problems, which we have identified were the following:

1. Lack of qualified IS/IT faculty throughout the Americas, but especially in Mexico, Central America and South America;
2. A subsequent shortage of IS/IT students;
3. Lack of IS/IT doctoral programs and faculty in these same regions, which further exacerbates the problem of qualified faculty, because many of the “best and brightest” attend U.S. universities and do not return to their homeland;
4. Shortage of IS/IT research funding to attract their own faculty and other North American faculty participation;
5. Difficulties collaborating with colleagues at great distances because of inadequate virtual collaborative technologies; and, finally,
6. A general lack of urgency to engage in research across the Americas. Most cross-cultural research tends to focus on countries in Europe, India, and Asia, where funding and other resources are more abundant.

To address these quite substantial problems we suggest taking a more trans-disciplinary approach to problem solving that was endorsed by George Kozmetsky et. al. [see TheATLAS; 2000]. The growing shortages of IS/IT majors worldwide has further exacerbated each of these problems for countries south of the U.S. border

### **DRAMATIC AND ALARMING DECLINE IN IS/IT MAJORS**

In a previous AMCIS paper [Becker, Hassan, and Naumann; 2006], we showed the dramatic and alarming decline in IS/IT majors in the U.S. and a precipitous decline in IS/IT doctoral graduates worldwide (386 doctoral graduates in 2001 to 83 doctorates in 2006). Declines in many IS/IT programs have been reported to be as high as 80% from their enrollment peaks during 2000-2001, just prior to the Dot.Com market collapse. Furthermore, in a recent NSF Grant application, “IT/STEM in Motion” [Becker and Thompson; 2008], we confirmed this alarming shortage of IS/IT majors is continuing at all academic levels at most universities in the United States and across the globe.

Becker and Brown (2000) noted the importance of Industry-Academic partnerships. In 2007 the Dallas/Fort Worth (DFW) Chapter of the Society for Information Management (SIM) started a grass roots effort to address this problem within a small target market place within the DFW area. They formed a special IS/IT Educational Initiative Committee

with over 30 members, of which I am a member. Their purpose is to develop solutions for the declining IS/IT enrollment problems within the DFW area. The Chapter has started several pilot projects and begun a partnership with three of the more highly developed high school technology programs in the DFW area: Denton Independent School District (ISD), Lewisville ISD and Mansfield ISD, who in conjunction with UNT are developing and developing educational pathways, starting as early as the 5<sup>th</sup> or 6<sup>th</sup> grade, that will excite, elicit, and entice (E<sup>3</sup>) more students to enter IS/IT-related fields in college (See Appendix 1).

The reasons for these the IS/IT enrollment declines are not perfectly clear. However, several reasons often cited include Dot.Com market collapse, in 2001, increased off-shoring of entry-level IS/IT jobs, and an often unattractive portrayal of IS/IT workers (geeks). While some of the reasons are economic-related, salaries of IS/IT professionals remain attractive. Thus, we contend that the root causes are more deeply seated in our society and culture, along with the basic infrastructure of our educational system, starting at early as grade school level (5<sup>th</sup> grade-level or possibly sooner). Recently the U.S. Department of Defense declared this growing shortage of science and technology professional (STEMs) to be a “national security concern.”

The past provides a possible solution to this current technology crisis. One should recall the two signature events that propelled the last great technological educational (STEM) boom in the U.S and the rest of the world: 1) the launch of the Russian Sputnik satellite in October 1957; and 2) the ensuing "Space Race" between the U.S. and former Soviet Union, which was so eloquently framed by President John F. Kennedy during his famous speech to the American people in 1961 [Kennedy, 1961]:

*First, I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to the earth. No single space project in this period will be more impressive to mankind or more important for the long-range exploration of space; and none will be so difficult or expensive to accomplish. We propose to accelerate the development of the appropriate lunar space craft. We propose to develop alternate liquid and solid fuel boosters, much larger than any now being developed, until certain which is superior. We propose additional funds for other engine development and for unmanned explorations--explorations which are particularly important for one purpose which this nation will never overlook: the survival of the man who first makes this daring flight. But in a very real sense, it will not be one man going to the moon--if we make this judgment affirmatively; it will be an entire nation. For all of us must work to put him there.*

Kennedy's words were not only stirring, but we may fail to recall that they also provided the steps necessary, a request to the American people for resource requirements, and a recognition that the entire nation "...must work to put him there." Some have said that it may take another “big, bold, unifying idea” to provide the impetus for the next “technology race.” The “Did you Know?—Shift Happens” [You Tube video, 2009], provides insights into the current global competitive challenges facing the U.S. and enormous population and intellectual ‘threats’ from countries like India and China. President Kennedy later confirmed the nation's resolve to engage in this "Space Race" [Kennedy, 1962]:

*“We choose to go to the moon in this decade and do the other things, not because they are easy, but because they are hard, because that goal will serve to organize and measure the best of our energies and skills, because that challenge is one that we are willing to accept, one we are unwilling to postpone, and one which we intend to win ....”*

## OBJECTIVES OF THE PROPOSED RESEARCH

We recognize that the solutions to these problems will require a sustained effort over many years by many people. However, believe that an important first step to its solution is simply recognizing the problem exists. In this spirit there are several short-term objectives, which we believe can be addressed in the next year. These are as follows:

1. Develop workable protocols for delivering distance learning in information technology-related courses with virtual collaborative technologies both within the U.S., Canada, Mexico, Central America, and South America;
2. Identify and promote areas of mutually beneficial cross-cultural research with faculty in these countries through the AMCIS Conference and other publication vehicles;
3. Extend our enrollment expansion initiative to areas outside the U.S., especially Mexico and parts of South America (specifically--Lima, Peru and Antofagasta, Chile); and
4. Provide guidelines for increasing the number of applicants in the information systems, sciences and technology areas to UNT and other programs of higher education in Texas.

The IT Educational Initiative Committee at the DFW SIM Chapter has proposed four **guiding principles** for identifying and selecting the most appropriate initiatives and activities to attempt [DFW SIM IT Educational Initiative Committee website; 2009]:

1. Realistic and **Sustainable** objectives based on resources needed (funding and manpower);
2. **Repeatable** activities that allow for a long-term commitment;
3. Must have **measurable** outcomes; and
4. High visibility and potentially **high public relations (PR) value**.

Examples of how these criteria are being applied to the DFW SIM Chapter plan are detailed in Appendix 1. They include such activities as: 1) recruiting members of the Chapter to serve on school district technology planning committees; 2) providing guest speakers to technology-related classes at all levels; 3) initiating articulation discussions between high schools and colleges; 4) proactively engaging faculty in the grade school with “gotcha” technologies, like Microsoft’s WorldWide Telescope project [Microsoft, 2009]; and 5) quite simply helping to identify what works and what does not work by comparing approaches across three different school districts.

### PLANNED ACTIVITIES

With an eye to the future but with a practical sense of what needs to be accomplished (Sustainable, repeatable, measurable, and with high PR value), we have identified these year-long activities (Appendix 1 contains a sample of these activities):

1. Collect additional data for the VT/CT research study [Becker, Ballantine, et. al., 1999, 2000, 2001, 2003, 2004, 2005] and grants [Becker, et. al.; 1998, 1999, 2001- 2002]. Over 70 organizations were extensively analyzed in the first studies. Only one of these was an academic institution (UNT). Our follow-up research would include a revisit to firms from our first sample in order to perform a longitudinal analysis of their virtualization progress as well as greater focus on academic institutions. In particular the study would evaluate and compare the levels of virtualization in select academic institutions in Mexico; Canada, Peru, Chile and other areas of Central and South America to corresponding universities in the United States.
2. Collaborate with my IS/IT faculty colleagues in Mexico and South America to develop distant learning courses in IS/IT that can be effectively taught cross-borders. A model for doing this was proposed in our 2006 study (Roden, Becker, et. al.; 2006).
3. Identify mutually beneficial cross-cultural research streams. Several research topics have emerged from our panel discussions over the last two years at AMCIS conferences. Among these topics are shared interests in the following areas: IT medical preparedness, analysis and comparison of Information and Communications Technology infrastructure, and alignment of IT with other components in the organization. One of our panelists, Dr. Jerry Luftman has expressed his eagerness to conduct his own IS/IT Benchmarking research in these areas. His studies could provide further insights into the overall IS/IT infrastructure of the area.
4. Produce a near-term strategy to reverse the downturn in STEM enrollments within Texas, and Dallas-Ft Worth area in particular. I am currently involved with several professional tasks forces and school districts that are examining and trying to address this problem, starting at the grade school level. This is a long-term problem, with no “quick and easy” solution. We expect that it may take 3-5 years to yield significant results. Implementation of these strategies is expected to be both time-consuming and quite political. However, as noted above, the DOD has cited the shortfall of IS/IT majors as a national security issue. Finally, we will assess how transferable these strategies are to Canada, Mexico and South America, where the shortage of skilled faculty has exacerbated the enrollment downturns even more.

The University of North Texas (UNT) will provide a semester-long paid leave to help underwrite these activities. Some additional travel and living expenses will be subsidized by the host universities outside of the United States. These other sources will be more appropriately acknowledged along with any related research findings.

### PERSONAL PROFESSIONAL GROWTH

This research will provide opportunities for my own professional growth in the following areas:

1. Broaden and deepen my research in the aforementioned areas;
2. Develop and test innovative approaches for teaching distance learning courses in technology-related areas;

3. Deepen my understanding of cross-cultural educational issues in the Americas, especially between U.S., Canada, Mexico, Peru, and Chile; and
4. Develop several promising avenues of cross-cultural IS/IT research with one or more “sister” campuses, especially: 1) Tecnológico de Monterrey, Campus Estado de México; 2) Universidad ESAN, Lima, Peru; or 3) Universidad Católica del Norte; Antofagasta, Chile. We plan to extend the collaborative technologies and virtual teaming research study to these areas as well.

### **ANTICIPATED BENEFITS TO THE UNIVERSITY AND THE IS/IT PROFESSION**

Since the University of North Texas has agreed to underwrite a major portion of this research, we need to identify several research deliverables for them. The following potentially measurable outcomes were identified:

1. Additional applicants to and graduates from IS/IT programs throughout the Americas. While we have had some successes in attractive non-U.S. students to our programs at UNT, most of these students have come from Asia, Europe, Africa, and India. The UNT administration has long recognized the need for more collaboration with our neighbors from south of the border.
2. Improved delivery of distance courses between UNT and university campuses in Mexico and other countries in South America. UNT is a recognized leader in distant learning technologies across the State of Texas. This would further enhance its reputation as a cross-cultural leader in distance education;
3. More effective use of collaborative teaching technologies for cross-cultural distance learning courses as measured by our own virtual teaming effectiveness measures; and finally; and
4. Increased educational and research collaboration between faculty, students, and universities throughout the Americas.

The successful delivery of these benefits will not only benefit UNT, but the entire IS/IT profession, at least with an initially small target market area.

### **SUMMARY**

The paper describes the how the author will merge three heretofore separate and independent research projects into one trans-disciplinary research project. The first research stream (during 1998-2004) [Becker, Ballantine, et. al.; 1999, 2001, and 2003] involved examining the application of collaborative tools for achieving effective virtual teams. The second research stream (during 2005-2008) [Becker and Sanchez, 2006, 2007, and 2008] proposed a model for developing cross-border university level classes and collaborative research among faculty within the Americas, especially in the Information Technology and Information Systems (IT/IS) field. Finally, the third research stream (during 2005-2009) [Becker, Hassan, and Naumann; 2006] attempted to assess and solve the worldwide downturns in undergraduate and graduate enrollments in science, technology, engineering, and mathematics, the so-called, STEM-related fields—especially information systems and information technology majors [NSF Grant: Becker and Thompson, 2008], [DFW SIM IT Educational Initiative Committee website; 2009]. When combined the research streams become a plan to utilize a combination of virtual collaborative technologies and face-to-face interactions with faculty and students throughout the Americas to increase the number of IS/IT majors at all educational levels: undergraduate, masters and doctoral degrees. The research project will commence in summer, 2009 and include visits and workshops with interested faculty in several Latin American countries. To the extent possible, we intend to use our “guiding principles” of sustainability, repeatability, measurability, and having a high PR value, to identify and select the best initiatives, which when applied to other regions, will drive ever increasing waves of change.

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**APPENDIX**

**Appendix 1.  
Phase 1: Strategic Planning Matrix – SIM/DFW Chapter Education Initiative  
Sustainable, Repeatable, Measurable, and High PR Value Objectives**

Initiative Name		Goals	Objectives	Metrics (People, Time, M\$ return (ROI), Facilities, M&E)	Costs
		<b>Over-arching Goal:</b> <i>“Increase the number of college bound IT professionals from DISD and MISD”</i>	<b>[Time frame, Deliverables]</b>		
1.	DFW SIM Chapter Memberships for 1 individual at DISD and MISD	Ensure two-way communication flows between SIM Chapter and ISDs-- Districts become aware of IT trends and issues and we enable personal networking between SIM members and DISD & MISD;  Provide future program topics	1. MISD & DISD rep. to attend all SIM chapter events  <b>[12 individual/ events]</b>	Number of individual./events attended	Value: \$520 each district
			2. Build net-works with SIM members <b>[50 personal contacts each ISD]</b>	Number of Business cards obtained by MISD & DISD and visa versa;  Size of Contact Directory	Actual costs: Meals & National dues (\$350 each; Holiday party & Golf Tournament?)
			3. Time: April to December 2008 <b>[8 months]</b>	LINKED or PLAXIO contacts	Total value: \$900 waived fees
			4. SIM Program in 2009		Net Cost: \$700
2.	Assign DFW SIM members to CTE Advisory Committees at DISD and MISD	Educate SIM members about problems and issues of DISD and MISD; ISD’s need to understand our capabilities and ;  Monitor progress of current initiatives; develop future initiatives	1. Short-term: Monitor current year’s progress 2. Long-term: Develop future phases and initiatives	5-6 SIM members to CTE Advisory Boards at DISD and MISD; and  1-2 individual SIMEDINT committee members on each CTE AB	
3.	SIM Chapter will provide a pool of subject matter experts ( <i>role model/speakers</i> )		Talent pool of 30 SIM members; RLF or TENG members?		
4.	Identify Internships	Increase understanding	Involve 2 students	Number of student	

	for DISD and MISD students	of IS/IT profession; network with students	at each district by Summer 2009	intern-ships	
			Involve 20 SIM members by Fall 2008	Number of SIM members onboard	
			Engage 10 SIM firms by Dec of 2009	Number of firms involved	
5.	Develop the appropriate articulation agreements between ISDs and Area Colleges and Universities	Articulation agreements provide a clear coursework path for students to progress from MS, HS, to JCs and Universities.	1. Establish articulation framework for IS/IT computer literacy course with UNT and UTA	Develop BCIS 2610-type course requirement equivalency at <b>DISD &amp; MISD by Dec 2008</b>	Faculty and Staff time
		<b><i>BCIS 2610 is the UNT IS/IT Computer literacy required course</i></b> for all business majors and may be substituted for the computer literacy requirement of other undergraduate degrees	2. Establish framework for NAF requirements for intro. BCIS courses	Develop BCIS 2610-type course equivalency at NAF; <b>target completion end of 2009</b>	Faculty & staff time; National Curriculum expert? \$1,500
			3. Investigate requirements for developing an <b>Advance Placement (AP) test</b> for BCIS <b><i>STRETCH GOAL</i></b>	Develop BCIS 2610 <b>AP Test Equivalency</b> for DISD and MISD – Begin Process by Fall 2008; target <b>AP test completion by end of 2009</b>	Faculty & staff time; Curriculum experts; \$2,000+