Initial Conceptual Design
For ASU's
National eLearning Institute

Primary facility at ASU Polytechnic

With distributed locals at ASU Skysong,

ASU Mary Lou Fulton Teachers College

and

ASU Foundation

The Organizations or Individuals Referenced in This Design have not Approved or Committed to Participate in This Design at this Date.

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eSATS

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DEFINITION OF ELEARNING INDUSTRY AND RESEARCH SITUATION

This design will address a broad range of constituencies each with their own jargon: business, economic development, education, and government. Emerging industries such as eLearning generate new jargon. Most readers are sold on the value of eLearning but need further development of the need for eLearning research and development (R&D). This preface addresses these issues to build a foundation for the National eLearning Institute design.

Definition: *eLearning is any learning supported by digital means*. eLearning is differentiated from its roots in legacy education of lecture and books. Hybrid eLearning is a mixture of both. eLearning can be delivered by a $10 Million aircraft pilot training simulator, a $200 video game, a CDROM based in a computer, or over the web with individualized online resources. There are many digital media types and eLearning aspects: voice (real, synthesized, recognition and translation), video, text, haptic (touch), graphics, animation, sound, virtual reality, 3-D modeling, simulated environments, continuous assessment, and intelligent coaches, tutors and agents.

eLearning Industry: The five major markets for eLearning products and services are individual, K-12, higher education, workforce, and military-simulation. The eLearning industry value chain has six major linking components: learning objects and content => aggregation of content => course and product line production => delivery systems and media => student interface system <= buying customer. Supporting infrastructure is: R&D; standards and certification, development capital, high bandwidth telecommunications, specialized services, and an industry specific workforce.
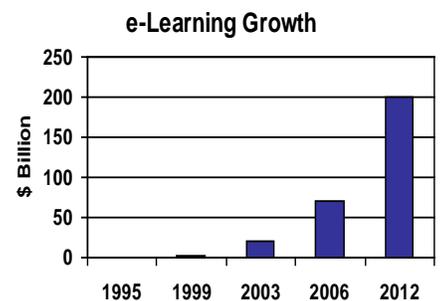
e-Learning Growth

Figure 1
Sources: Merrill Lynch as Reported in WSJ 3/12/01 and Brando Hall

Value Proposition: eLearning delivers accessibility and efficacy to education and training. Accessibility is provided by telecommunication networks, Internet and the Web, and personal computers. Efficacy is measured by student academic performance to grade level. If a student scores at a C level with legacy education and at a B level with eLearning then academic performance has improved by one "sigma." Hundreds of studies of past and current eLearning technologies show a 0.3 sigma increase for computer based instruction, 0.5 for interactive multimedia instruction and 1.0 for early intelligent tutoring systems. IDA research for the Navy shows a sigma of five for a current intelligent tutor.

Research Potential: A massive amount of development and testing is needed to transfer current research into a vast array of products and services to serve all five markets. An equally massive amount of basic and applied research is needed over the next twenty years to reach the goal of 2.0 sigma increase over legacy education and training. Healthcare research receives $10's of billions with other technology based industries multiple $billions. Although the United States spends over $800 billion in education and training only $196 million was invested in eLearning technology R&D in 2000. Most of that was military. Federal research support the eLearning industry is still stuck in the $200million range.

Arizona eLearning Industry Assets: Over the past 20 years Arizona has emerged as a leading eLearning cluster region with $1 billion in revenues from dozens of enterprises in 2003. Growth to $10 billion range is expected soon. The Phoenix-Mesa Gateway Campus includes the Air Force Research Laboratory facility. They were the world leader in eLearning simulation pilot and distributed mission training with a staff of 185. ASU Polytechnic has a technology and innovation focus including eLearning. eSATS is non-profit eLearning advocacy task team based in Arizona. GAZEL is an Arizona eLearning enterprise cluster organization supporting the accelerated growth of the $1 billion Arizona eLearning industry.

1. Executive Summary

Arizona is uniquely positioned to become the economic, academic and research center for the newly emerging high tech industry - eLearning. The market potential is huge – with education and training the final major industry ready to be transformed with technology. To capitalize this potential economic success, Arizona needs to focus on the skilled workforce (academic) and accessible technology (research) parts of the equation.

In my freshman year (1956) at MIT's Dept. of Aeronautical Engineering I had an introductory course taught by a 70-year-old emeritus professor Jerome Hunsaker. I did not know it at the time but as a young Navy officer in 1912-1914, Hunsaker went to France and brought back the latest in wind tunnel design. He was the force behind the founding of NACA, the National Advisory Committee for Aeronautics and initiating federal aeronautical research by building the Langley wind tunnel facilities. Hunsaker then went to MIT to found their Department of Aeronautical Engineering. He transformed civil engineering of structures and mechanical engineering of engines and fluids into a new discipline: aeronautical engineering.

Arizona has the opportunity to do same. Aviation was the starter industry for the 20th century, eLearning is the starter industry for the 21st.

The creation of the National eLearning Institute in conjunction with an ASU Polytechnic department of eLearning engineering (yet to be formed) with their Air Force Research Laboratory; and the rest of the ASU eLearning innovative institutions, and Arizona eLearning industry cluster. The ASU National eLearning Institute would be an leading 21st century U.S. education, jobs, economic development driver.

The design of the National eLearning Institute goes beyond current research institute design practice with its comprehensive design, partnerships, and leadership positioning. It is not only going to conduct basic and applied research, but it will also deliver:

   Conduct eLearning research from the teacher-student nexus with an initial focus on the evolving elearning pedagogies for self-taught student, teacher-K-12 student nexus; school leaders – in-service teachers; professors – college students; self-taught professors/trainers, and training-education and professional development for all professions.

   An eLearning research roadmap with funding for a network of other institutes/researchers;

   A comprehensive research and development field testing operation for all eLearning markets;

   A meta-data repository system (cloud) for all eLearning objects and research;

   A research based eLearning system for transform of teaching professional practice;

   A spectrum of methods and relationships to accelerate the flow of research into enterprise products and services;

   Public relations, marketing, and selling operation to open the coffers of federal research funding and create a global network of institutions for integrated eLearning-Research-Enterprise.

The critical success factor is growth of federal eLearning research funding at the level other technology based industries enjoy. National eLearning Institute will be design as an effective initial user of this increased research funding. It would initially employ 1000 researchers and staff. Its 250,000 square feet of offices and laboratories would enjoy a 15 acre campus on the Phoenix-Mesa Gateway Airport. It's operational and research funding would grow to $400 million a year. More importantly, National eLearning Institute will be a leader in the advocacy for creation of a global network of eLearning institutes to serve the complete needs of the eLearning industry. Arizona eLearning industry cluster will be blessed with a tremendous competitive advantage. Arizona will be the first state to take advantage of eLearning to transform jobs, workforce development, and the economy.

2. eLEARNING RESEARCH SITUATION ASSESSMENT

Over the past 70 years military-simulation has been a consistent source of high level eLearning research and continues to grow. The 2002 DOD study "Training Superiority and Training Surprise" http://www.acq.osd.mil/dsb/trainingsuperiority.pdf opened an new chapter. DARPA's new $2 billion program to support eLearning enterprise product development is in the works. Meetings are meetings are underway to plan a Modeling and Simulation Institute in Arizona.

There is significant crossover and current funding between simulation and modeling for design and analysis of products/services and for delivering eLearning. Also, there is significant federal interest in distributed learning include significant support for the Advanced Distributive Learning System, FasTrak eLearning for 57 government agencies and major implementations in all armed services. Federal eLearning adoption commitment must be used to position eLearning as a prime candidate for significant research funding increases.

Since 2003 the Learning Federation www.fas.org/learn/ and many others are working to increase the federal R&D funding. Their initial call was for a total of $600 million to $1 billion, up from $200 million. Most should be used to expand research into the non-military markets of K-12, high education, workforce and individuals. There are only a few dozen eLearning research institutes and centers (Appendix B) and most have research staffs smaller than 30. National eLearning Institute would be the driver for as the first of many new research institutes at funding levels that National Institutes of Health, Department of Defense and NASA enjoy. There campus and distributed network research serve as models.

3. DESIGN SPECIFICATIONS AND FUNDING ALLOCATIONS

Timing is urgent for rapid development of this purpose designed eLearning Institute. It would have adequate size and research capability to address multiple markets within a set of eLearning technology areas. The National eLearning Institute facility could build on current strengths at ASU at the Phoenix-Mesa Gateway Campus addressing simulation and modeling technologies for eLearning. It could also focus on distributed aspects of eLearning: mission training, work, machine operation, collaboration, training and education. A strong collaboration with Arizona's leading cluster industries: aerospace, biotech-biomedical-biodesign, information technology, military, semiconductor, financial, optics and software would provide a unique and attractive infrastructure for developing these technologies to support their workforce needs. Many of Arizona's eLearning enterprises have products and services that could be enhanced with researched based simulation and distributed technologies.

The National eLearning Institute is designed to grow to a $2 billion operation over the next five years. It is traditional for a research institute to lead with intramural research. The remaining six aspects of the Institute deviate from tradition because of the need to initiate, prototype and implement leadership in an emerging industry. The eLearning industry lacks major infrastructure components that mature industries enjoy. The National eLearning Institute is design to deliver a complete prototype of this infrastructure using the entire state of Arizona.

1. NATIONAL eLEARNING INSTITUTE (Intramural Research) $900 million (45%): This intramural research facility will be a cross between the single NIH campus of 75 buildings on 300 acres in Bethesda, MD and the global NASA network of research laboratories and test facilities. This single campus facility will specialize on major category of eLearning research like a NASA laboratory. But it will also use the most advanced distributed eLearning and collaborative work systems to simulate an NIH cross-discipline campus with the other eLearning researchers. The 3000 person facility includes 450 principle investigators, 2150 research staff (1/3 university students) and 200 administrators. The facility would require 450,000 square feet of office space and 100,000 square feet of simulation and distributed research laboratories on 15 acres. Cost to build would be approximately $200 million. One location might be on the west side of Ray road entry to the Phoenix-Mesa Gateway Airport.

2. FUNDED RESEARCH INSTITUTIONS (Extramural Research) $920 Million (46%): National eLearning Institute fund a select set of leading eLearning research centers and institutes that could be university, private, consulting, government, or military based. Approximately 80 research grants with 20 research organizations would support 120 principal investigators to fill out the National eLearning Institute research roadmap. This roadmap would be developed and updated with a coalition of leading eLearning researchers, enterprises and customers across all markets. A percentage of funding will be reserved for developments that promise early commercialization.

3. FIELD TESTING OPERATION $40 million (2%): The healthcare industry has a massive, highly controlled field testing system for new pharmaceuticals and devices. Much of the data produced is used by the FDA for new drug approval. Safety and efficacy is tested within the context of the hospital, doctor's office and patient. eLearning enterprises need the same professionally operated resource to assure products are accessible and effective, and to provide certification to standards. This system will support basic and advanced research, rapid prototyping and market-product development.

National eLearning Institute will create and operate this multi-enterprise and multi-market field-testing system. At a typical cost of $100,000 per client the facility could conduct 300 testing projects a year. A digital monitoring system of student learning performance will be provided within six contexts: K-12, community college, university, individual, work force and military-simulation.

> **K-12**: Arizona will shortly have the first networked system to deliver 1 gbs Internet service to every K-12 desktop. Arizona Department of Education is developing and implementing a state wide data system for every student and teacher to capture both formative and summative assessment data. There Integrated Data to Enhance Arizona Learning has a learning portal that supports both student learning and educator professional development.

> **CC:** Maricopa Community College District is the largest in the U.S. with over 250,000 students, 50,000 on web-based learning systems. They have a thirty-year history of eLearning product testing starting with Plato's Ticket in the 1970's. They have field tested Microsoft eLearning systems. Pima CCD and a number of rural colleges round out the depth and breadth of the testing system. The national community college League for Innovation is located in Chandler, AZ.

University: Three Arizona public universities, NAU (NAUNET), ASU (JACMET) and UofA (Distance Learning Research), have pioneered higher education applications of eLearning. University of Phoenix – Online is the world's largest private university serving students' world wide with over 250,000 students. Their technology is based on 23 years of continuous innovation. All universities are actively adopting eLearning and would benefit from testing cutting edge products.

Individual: Several of cadres of individuals from novice to expert will be developed that can be used as test subjects. Cadres will range from children for edutainment products to seniors.

Workforce: Many large employers are expanding eLearning operations to train and educate employees. eLearning ranges from IT training and soft skills to custom job specific content. Many Arizona businesses from large to small over a wide range of industries will be enlisted to serve as test subjects.

Military-Simulation: Simulation and distributed mission training research operations were led by the Air Force Research Laboratory, and part of their talent pool remains in Arizona. The military has significant operations in Arizona: telecommunications training at Fort Huachuca, air training at Yuma Marine Air facility and Luke Air Force base, multiple sites for Arizona National Guard and Reserve forces. Arizona aerospace operations including training schools use flight simulators. Simulation is also being used for training medical personnel. In the past he Guard has supported Iowa as their lead state for eLearning. But the Guard concern about the lack of useful research could shift focus to Arizona.

National eLearning Institute will layer an eLearning field testing function over the entire state. All types of schools, colleges and training operations will be contracted and trained to serve within a multi-enterprise and multi-market field-testing system. These test subjects and their organizations would benefit as early adopters of researched based eLearning products and services. New product accessibility and efficacy testing would pay a direct dividend by enhancing their student performance and keeping them competitive.

eLearning enterprises can deliver experimental prototypes and final designs for accessibility and efficacy testing. Research institute can test theories and develop engineering tools in a rich and responsive environment. A National eLearning Institute department of field-test engineers and management will support development of testing protocols, interface with schools, colleges or training operations, and deliver the test data and analyses to the enterprise clients.

4. eLEARNING OBJECT METADATA REPOSITORY $40 million (2%): National eLearning Institute will design, develop and operate the eLearning object meta-data repository system. This meta-data repository will provide affordable access to millions of standardized learning objects for both commercial and public use. A portal would deliver access to any educator, trainer, curriculum development specialist, librarian, individual, or eLearning product developer. The repository accesses a global set of databases containing standards compliant digital learning objects. The registry system will be extensible and scaleable as simulation, intelligent tutors and avatars; voice recognition, virtual reality and other emerging technologies join the initial components of learning objects: graphics, text and video. This system be certified under the continuously evolving eLearning object standards including IEEE, SCORM, IMS, AICC, Dublin Core, XML and Prometeus. All eLearning industry sectors can register their learning objects for commercial use. This resource will support financial transactions of intellectual property within the learning objects, thus removing a barrier to eLearning industry commercialization.

5. TEACHER PROFESSIONAL DEVELOPMENT $40 million (2%): Curriculum developers, teachers, trainers, facilitators and professors (teachers) are the critical barrier to adoption of emerging eLearning products and services. As long as legacy processes and professionals dominate education and training delivery, research based eLearning adoption will reach a fraction of its potential. Both intramural and extramural research programs will address basic and applied research to develop teacher professional development pedagogy within the context of eLearning. Gateway L/R/E will also design, develop and prototype the teacher development system. This system would require concurrent research and field-testing. The development needs of individual and collaborative eLearners will also be studied as they assume self-teaching roles traditionally reserved for the teaching professional.

6. INNOVATION DRIVER $40 million (2%): The National eLearning Institute must develop a deliver industry advocacy and technology transfer well beyond a traditional research institute. The 8% is a radical departure from the typically 1% allocated by most research institutes. The eLearning industry is growing at a rate far outpacing similar industries. Traditional innovation diffusion time needs to be accelerated with a well supported deal and relationship building engine. A team of top entrepreneurs, investor-venture capitalists, and marketers will design and staff this innovation driver. The innovation driver design components and theory will be based on processes pioneered by models that worked in the past Sematech, DARPA, Lockheed Skunk Works, NIST- Advanced Technologies Projects, Columbia, 3M, MIT and others just now emerging. Special facilities and temporary development operations will require funding. Continuous engagement will be maintained both within and across eLearning industry segments targeting: researchers, entrepreneurs, investors, enterprise staff and customers knowledgeable about the markets, technology and infrastructure.

7. RESEARCH METADATA REPOSITORY – OPERATIONS -- ADVOCACY AND $20 million (1%): The National eLearning Institute board will establish administration-operations, and facilitate the planning, design and implementation of the seven aspects. They will collaborate with East Valley economic development professionals, Phoenix-Mesa Gateway Airport Authority, and ASU to build the research office and laboratory facility.

Their eLearning Research Meta-data Repository will provide access to every significant piece of eLearning research in process or with published results. It will emulate an "Index Medicus" for eLearning. A typical registered data set would be Star Schools project by DOE which has invested $200 million in K-12 eLearning research. Other sources include funded research under NSF, DOD, DOE, Army, Navy, Air Force and now DARPA. This system will provide access to the universe of current and planned eLearning research, as well as principle investigators and researcher expertise.

The 2005 "E-Learning Research Portal Study" by members of eSATS task team under contract from Institute for Defense Analyses and DOD is the design manual for the repository.

National eLearning Institute will partner with eSATS and GAZEL to support global advocacy for eLearning research funding. To capture mind share and support for eLearning research and adoption, the massive and continuous public relations, marketing and selling effort will use National eLearning Institute as its prototypical model.

4. INSTITUTE DESIGN PHILOSOPHY, GOVERNANCE AND LAUNCH

DESIGN

Designers will assure that learning, research and enterprise are well served by the National eLearning Institute. Their study will include historically effective models such as National Institutes of Health and National Aeronautics and Space Administration. The use of inter-organizational design theory and emerging models such as Arizona's biotech initiative and ASU's transformation under the leadership of Dr. Michael Crow will result in a practical design for Arizona. The Peter Slate's Arizona Technology Enterprise, Dick Love's Tgen, Rob Melnick's Technopolis and Anil Jain's The Indus Entrepreneurs are all innovative means to link lab research to commercial markets. It will also be positioned as a model to support creation of similar institutes at other centers of the proposed global eLearning research network (Appendix B and C).

GOVERNANCE

eSATS is wrapping up their facilitating and advocating the initial organizational design and pre-launch phase of the initiative. The leadership of eSATS has cultivated a number of folks who are national resources for support. eSATS will support board attraction, facilitate board planning, and provide input on the national marketing and public relations, and bring national education, enterprise and government eLearning leadership to the process. eSATS will use their web based enterprise registry to connect with 1000's of global eLearning enterprises and institutions for support. eSATS will also work with active peer associations in Arizona, Boston, Greater Washington, Orlando, Vancouver, and San Francisco Bay Area to develop support. As the National eLearning Institute Board is activated they sanction a small team of Arizona and National leaders to implement the initiative.

GAZEL will help organize and bring Arizona eLearning enterprises into the National eLearning Institute formation process. The GAZEL initiative in K-12 includes is compatible with the National eLearning Institute. Major enterprises are potential candidates for support: Arizona School of Health Sciences, Gary Cloud, health care eLearning, Boeing Corporation, Pearson Digital Learning, Rio Salado Community College, University of Phoenix Online, Apple, Blackboard, Cisco Learning Academy, EDT Learning, Evans Newton, inXsol, Knowledge Net, LearningStation.com, Mindplay, Thunderbird, Tracorp, and Unicon.

Southern Arizona Technology Council and Arizona Technology Council are umbrella organizations to lead and coordinate activities and initiatives of their regional high tech industry cluster groups. GAZEL is linked to both councils. Their members range from large manufacturers like Intel, Motorola, Raytheon and Honeywell to the thousand+ smaller enterprises and support organizations. Their eLearning education and training needs provide a unique relationship between GAZEL and her sister cluster organizations.

Arizona Customers: There are many other potential workforce development customers that can provide support and reap early benefit from the National eLearning Institute. The include Arizona public and private colleges and universities, the K-12 education system including the Arizona Department of Education, and non-high tech businesses such as retail, utilities, mining, agriculture, financial services and construction.

Arizona Economic Development includes leaders from East Valley, greater Phoenix and Arizona, Arizona Department of Commerce, Governor with Innovation and Entrepreneurship Task Force, Legislature, and Universities. City of Mesa economic development has had a supportive meeting.

National Resources include leaders in the eLearning research (Appendix B), national initiatives like the Advanced Distributive Learning System, funding sources of NIH, NSF, DOE, NASA, DOD and DARPA, individuals and institutions heavily invested in eLearning enterprises, and federal government eLearning advocates (e.g. Dexter Fletcher (from Wickenburg) of IDA). The current leaders in the U.S. Department of Education are highly tech savvy from industry include Karen Cator Director of Educational Technology and James Shelton III, Deputy Director for Innovation and Improvement.

LAUNCH

Ten years ago a number of Arizona initiatives have opened the door for the National eLearning Institute. eLearning gained prominence in the 2000 Governor's "Arizona Plan for the New Economy" http://www.azcommerce.com/prop/Arizona%20Partnership%20For%20The%20New%20Economy.html . The successful biotech initiative demonstrated a unique transformation in Arizona's capability for economic development in the high-tech information age. The biotech initiative is resulting in $100's of millions for Arizona investments in research and research facilities. The recent Battelle study on Arizona research opportunities included simulation and modeling and information technology. The recent ASU Morrison Institute report "Seeds of Prosperity" reported on Proposition 301 funds applied to eLearning components within their Information Technology and Workforce sections. The National eLearning Institute has a solid fit within ASU's Connections, Attention and Talent value-added criteria, especially in the Talent area – the heart of all economic development.

A compelling design and general community support are necessary but not sufficient. A small team of dedicated champions is also required. The Mallery-Crow-Napolitano team is opened a flow of federal research funding into Arizona currently well past $700 million. The Biotech team was classic. An inspired team of champions from the six major stakeholder groups must come together with full commitment. In parallel the Board must form, attract initial funding and take the National eLearning Institute design to a detailed level. Together it could be a very interesting ride.

The initial design work of this document was reviewed by Al McHenry, Dean of the ASU East College of Technology and Applied Sciences in 2003. It was decided to take a step on this "Big Idea." Professor Jon Duff of ASU East headed the pre-proposal effort to the National Science Foundation for a research center focused on Distributed Learning for $2 million level for five years. The partners in this proposal were the Air Force Research Center, the Curriculum and Instruction department within the ASU College of Education, the Arizona Learning Technology Partnership and eSATS. A few years later the Arizona eLearning Task Force was created by the legislature in 2006 and members appointed by legislative leadership and the governor. I has provide a series of study reports to influence current legislation.

Today these 2003 eSATS grouping of concepts on research-learning-enterprise-education have been slowly propagated by others throughout Arizona, especially within university – foundation – governance triad.

5. Action Agenda -- Time Line

	200?				200?	200?	200?
	Q1	**Q2**	**Q3**	**Q4**			
Fund/Launch National eLearning Institute							
Organize Board/Team		Start	Finish				
Funding			150K	550K			
Operations			Staff	Office	Building	Buildings	
Meta-Data Learning Objects Repository			Proto-type	K-12	Work Force	Higher Education	Global
IM Research - People				15	75	250	500
EM Research - Grants				2	8	40	80
Field Test Operation			Design		Build/ Calibrate	20%	40%
Teacher Prof. Development				Plan	10%	20%	50%
Innovation Driver People			Design		2	18	41
Advocacy			Pitch	PR	Industry	Foundations	Government

6. WHERE TO GO FROM HERE

The potential still exists for ASU to do a carpe diem on eLearning for the 21st century. I will not happen with the incremental approach of building out small institutes and disruptive innovation like SkySong.

It will take a massive vision like my old professor, Jerome Hunsaker concocted adn pulled off in the early 20th century to establish aviation leadership with research institutes NACA and university aero-engineering department at MIT to drive innovation.

It will take a 21st century level massive investment to crate the leading eLearning institute with the novel concept of integrating the experts and people being served in an entire state by this institute using innovation driven by big entity strategic planning and implementing and driven top down by the big entities. Only then will the bottoms up innovation begin to thrive and our students at all levels and venues be served.

We had a trial run with Bioscience's that positioned Arizona in the top 50 in a maturing industry. Now we need to pull together a more powerful team with ASU at the center to seize the #1 opportunity of the 21st century.

APPENDIX A. ESATS BOARD MEMBERS

eLearning Systems for Arizona Teachers and Students Inc. Task Team that functions as board.

Name	Organization
Dee Andrews PhD	Military eLearning Consultant
Oris Friesen PhD	Future Information Technologies
Mark Goldstein	International Research Center
Francine Hardaway PhD	Stealthmode Partners
Ted Kraver PhD	Arizona eLearning Task Force
Bob Rosenberg	Rosenberg and Assoc.
Barbara Kraver	GAZEL
Mike Keeling	Keeling and Keeling Law

Greater Arizona eLearning Association Board

Name	Organization
Michele Smith	Tracorp Inc.
Maggie Martinez PhD	The Training Place
Ted Christensen	Higher Ed eLearning Consultant
Steven Moore PhD	Science Approach
Steven Banick	LearnCast
Richard Brincefield	Global Literacy Foundation
Steve Peters	GAZeL Coordinator
Ross Abramson	TransPerfect
Joel Barthelemy	GlobalMed
Brenda Beal	Integra Telecom
Debra Dupee	Advanced TechSystems
Sharon Hill	eLearning Consultant
Janet Major	AZ Telemedicine Program
Brent Schlenker	The eLearning Guild
Craig Ward	Vector Resources Inc.
Mike Whipple	Systems Archecture
Bob Rosenberg	R.G. Rosenberg & Associates

APPENDIX B. POTENTIAL L/R/E INSTITUTE EXAMPLES

Mesa AZ, ASU Polytechnic + Air Force Research Lab: Aerospace workforce - simulation and distributed learning and training;

Scottsdale AZ ASU Skysong, Adaptive Learning – Digital Curriculum;

Tallahassee, Florida State - Learning Systems Institute: Intelligent mentors, teacher professional development;

Pittsburg, Carnegie Mellon, Software Engineering Institute: Semantic networks;

Utah: Utah State-ID$_2$/Brigham Young: Learning object instructional design, pedagogy development;

Bangalore India: Teaching support for web-based learning;

London, England: Massive scaling of on-line learning systems;

Los Angeles, UCLA: Student real-time assessment, small group collaborative learning;

Israel: Education system reengineering;

Cambridge, MA, MIT Media Lab: voice interfaces, transforming higher education, artificial intelligence;

Atlanta, Georgia Tech: cognitive learning processes, case based methods;

Evanston, IL, Northwestern Institute for Learning Science: Guided scenarios, rich media;

Washington D.C., George Mason – ADL Standards and certification;

Cambridge, MA, Harvard: Workforce development within the eLearning industry;

New York, Columbia Teachers College: Teacher-Trainer-Professor-Facilitator education;

San Francisco/Los Angeles/NYC: Rich Media and Learning Content

Seattle, Univ. of Washington: Virtual reality.

Orlando, Central Florida University, Institute for Simulation and Training. Simulation

Japan, National Institute of Multimedia Education --

Dublin Ireland, Digital Media District – MIT Media Lab Europe.

Vancouver British Columbia, The Commonwealth of Learning

NASA Johnson Spaceflight Center – Simulation

European Commission Educational Technology R&D

APPENDIX C. NATION ELEARNING INSTITUTE NETWORK CONCEPT

If federal eLearning research is going to be funded at a $10 billion level then at least 5 institutes of the size of the ASU National eLearning Institute are needed. They would employ $5 billion for their operations. The remaining $5 billion would fund grants numbering 10,000 (average of $500,000) to support 10,000 principal investigators and their eLearning projects. These numbers were ratio'ed from the current National Institutes of Health funding implementation.

A 2012 launch of the National eLearning Institute will be designed for other communities and countries to launch their versions based on needs and strengths. Using the NASA model of linked laboratories and research centers there would be a collaborative research plan and communication system between these institutes. There overall goal would be to uncover engineering design tools from basic learning processes to integrated learning support systems. Of equal critically would be to integrate these tools, product ideas and services into the global eLearning industry. This will maximize transformation of the world's legacy education and training practices into the world of eLearning. Within the next decade, L/R/E/E based research is expected to drive accessibility to every human on the globe. Average learning efficacy has been stagnating within legacy education and training over the past 40 years. Current eLearning research and field testing portends two-sigma improvements will flow out of the innovation pipeline into our nation's education system within ten years.