



September 15, 1997

Dr. Wayne Peay  
Utah System of Higher Education  
355 West North Temple  
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Salt Lake City, UT 84180-1205

Dear Wayne,

In response to your letter of July 3, 1997, enclosed please find the final report on our Higher Education Technology Initiative (HETI) project *Science Without Walls: Science in Your World*, a new science telecourse.

Please let me know if you need any further information.

Sincerely,

J.D. Andrade, Ph.D.  
Professor and P.I

cc: C. Drew, Associate Academic VP  
K. Campbell, Producer, Media Solutions  
K. Rodin-Popich, Division of Continuing Education  
G. Gibson, Media solutions  
M. McDonald, Manager, CISE  
C. Detar, Co-Director, CISE  
J. Francis, Undergraduate Studies  
S. Lubdomurov, Liberal Education  
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Encl: final report

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## FINAL REPORT

# Science Without Walls: Science in Your World

A University of Utah, Channel 9, Telecourse Project  
supported in part by Higher Education Technology Initiative Funding.

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### Executive Summary

*Science Without Walls: Science in Your World* is a forty program, twenty hour, Channel 9 telecourse offered through the University of Utah's Division of Continuing Education for five quarter hours of Liberal Education credit. The course was offered Fall and Spring 1996-1997 and will be offered again Fall and Spring 1997-1998. It will continue to be offered in a semester format, effective Fall 1998.

We estimate that the course cost about \$200,000 to produce, including \$60,000 of HETI funds. This estimate does not include over two full time years of faculty support to course originator and writer, J.D. Andrade, nor does it include the time and efforts of many advisors affiliated with the Department of Bioengineering and the Center for Integrated Science Education.

The course was produced by Kristy Campbell, Media Solutions, and is probably the most video intensive telecourse ever produced in Utah. From the very beginning, the objective was to minimize the "talking head" (talking lecturer) characteristic of most telecourses. By using appropriate video to illustrate the content. Although considerable original video material was produced for the course, we made use of much "free" material whose permission required significant distribution constraints.

The programs have been very popular with the Channel 9 general viewing audience and with the local community.

The first major offering of the course had a nearly fifty percent dropout rate, primarily due to student concern over the volume of work involved. There is apparently a general perception among students that telecourses are or ought to be relatively easy and not require much time commitment beyond program viewing and perhaps some minimal reading. This is a perception that must be corrected if telecourses are to play a significant role in meeting the educational needs of Utah's residents.

There has been little or no interest in making the course available to other institutions in Utah, in part, due to the apparent lack of a mechanism or incentive to facilitate such cooperation and sharing. The University of Utah administration has indicated little interest in making its courses available to other institutions. This lack of interest in cooperation and in "selling" or "marketing" individual institution resources is an issue which needs to be addressed by the Regents and by the Governor and his staff.

### Contents

#### *Executive Summary:*

1. Description of project

The development, production, and testing of *Science Without Walls* has been a very involved and extensive project. J. Andrade is committed to continuing to develop and enhance the course and its materials. He is convinced that it is a good course and deserves distribution beyond the confines of the University of Utah and the state of Utah. Joe has made copies of videos from the course available to interested colleagues, scientists, and educators, both within and outside of Utah, in the hopes of encouraging and inspiring them to consider similar projects and activities.

In spite of repeated urgings and meetings between appropriate University of Utah administrators and Regents representatives, there has been little interest and no activity in trying to make *Science Without Walls* available beyond the University of Utah. Part of the reason is that there is almost no incentive to do so. This is due to the way tuition is structured across the various institutions and the fact that there is little spirit of collaboration or interaction among most of the institutions. The Regents have not been successful in encouraging, enhancing, or insisting upon such interaction and collaboration. So, not surprisingly, very little has happened. Part of this is due to the semester conversion and the fact that most institutions have been in a state of transition and change. Part of it is due to the budgetary problems which plague higher education. But the major part of it is due to the major lack of leadership, in the Regents and in the various institutions. There simply has been little interest in this topic, in spite of the Governor's pronouncements in support of collaboration among institutions and the application of advanced technologies for higher education. Even the Western Governors' (virtual) University, which has received so much press and notoriety, seems to have little or no interaction with the existing outreach, continuing education, and television course activities of most of the institutions in the System. The result is that we are seeing some level of duplication confusion, and in the availability of programs which can be far more greatly and effectively utilized.

## 5. Recommendations

### • University of Utah

It is my perception that the University of Utah does not fully understand the importance of and the need for quality distance education programs. There is still a perception among most of the faculty that such programs are "continuing education" or "adult education" and are therefore not serious or appropriate for degree credit. Changing such perceptions requires leadership and attention. It is not yet happening at the University of Utah.

There is also little or no understanding that anything on television is a very effective form of public relations and a way to inform the community at large of University activities and services. Indeed, the University does this very effectively with Channel 7, but does it very ineffectively with Channel 9.

The University of Utah should get serious about distance learning.

### • The Regents and the System of Higher Education

Although the Regents have administered the HETI initiative and various other initiatives, there appears to be little or no serious activity in encouraging, enhancing, and even if necessary insisting upon inter institution collaboration. Part of this is complicated by the different tuitions, the different qualities and expectations, and other differences among institutions. In my opinion, the real problem is simply the lack of leadership and motivation.

### • The Governor

The Governor has made it clear that his administration is interested in using modern technologies to facilitate higher education and in making higher education available to the entire Utah population. However, that vision has not been fully embraced by all of the System of Higher Education, perhaps, in part, because there has been insufficient dialogue between the Governor's Office, the Regents, and the various institutions involved, including the Western Governors' University.

The Governor's vision should be expanded to include Utah's prison population and the aged, yet there is little apparent discussion or interest in using Utah's electronic education technologies, including distance education and telecourses, to help educate and rehabilitate those in

**Program 27: *What Is Life? -- The Very Early Days***

*It's genealogy time — The record is going to take us way, way back — billions of years back — your molecular genealogy...*

Christian de Duve, Pre-Biotic Chemistry, 7 Ages, CHNOPS, RNA, Membranes, Liposomes, Protocells, Cells, Mitosis - Fusion

**Program 28: *What Is Life? -- From Bacteria To You***

*We each have a very extended family. Your personal cellular genealogy and your symbiotic dependencies...*

Genealogy, Cells, Bacteria, Eukaryotes, Mitochondria, Photosynthesis, Mitosis-Fusion, Symbiogenesis, Sex, Multi-Cellular, Cambrian Explosion, You!

**Program 29: *Energy In: Fuel & Light***

*You don't have an electrical cord for a tail, nor do you have a big battery compartment. Where do you get your energy? What makes bioenergetics so portable and so special?...*

Bioenergetics, ATP, Currency, Recharging, Oxidation-Reduction, Anaerobic, Biochip, Aerobic, Chlorophyll, Electron-Transfer, Photosynthesis, CO<sub>2</sub>/O<sub>2</sub>/Plant/Animal

**Program 30: *Energy Out: Biomass And Work***

*Biology collects energy, for food, reproduction, growth and for building communities and civilizations. Plants, animals, and other life forms -- and their motions...*

Photosynthesis, Rubisco, CO<sub>2</sub> Fixation, Plants, Biomass-Biopolymers, Muscle, Work, Motion, Myosin, Activation Energy, Red and White Meat

**Program 31: *Information In: The Senses***

*You are a set of sniffing, seeing, hearing, tasting, and touching information gathering machines. Making sense of your senses ...*

Senses, Information, Brain Maps, Neurons, Rod-Cone Bio-Chips, Vision, Hearing, Waves, Wavemaker - Sounds, Strobe, Smell, Chris Johnson, Surface Fields

**Program 32: *Information Out: Language, Communication, And Culture***

*A child's cry, Rod Stewart, and your significant other's most sensuous voice— what do they all have in common? Perhaps a dropped larynx, a 50,000 year old mutation, which makes you and me far more communicative than our chimpanzee cousins ...*

Animal Sounds, Language, Brain, Jared Diamond, Larynx, Vocal, Voices, Language, Signing, Bioluminescence

**Program 33: *Your Brain And Consciousness: Use It Or Lose It!***

*What do all these folks have in common?: Einstein, Jay Leno, Madonna... Yes, they're all celebrities, and they all utilize a 1 liter, 2+ pound mass of wet and squishy tissue — the least understood piece of matter in the universe. Their brains, like yours and mine, are conscious. This time, on Science Without Walls.*

Brain, Reptile, Man, Neural Connections, Cortex, Susan Greenfield, Epicenters, Consciousness, Focus, Attention, Christian de Duve

**Program 34: *Is There Intelligent Life On Earth?***

*You're cruising the solar system in an extra-terrestrial starship. You're on life detection watch, manning the sensors. Is there life in this solar system? Is there intelligent life on Earth? Another wild ride..*

Voyager - Pale Blue Dot, Earth Sensing, Planets, Atmosphere, Living Earth, Emissions, Photosynthesis, Luminescence, Greenhouse, Ozone, Dominant Life Forms, Australia Ad.

**Program 35: Planetary Medicine: The Gaia Model**

*Your favorite gardener, physician, and weatherman — they all make unique and important contributions to the health of that super organism on which we all depend -- planet Earth. Planetary medicine ...*

James Lovelock, Animals - Plants, Gaia, System, Earth & Mars, Attention Deficit Disorder, Planetary Pathology, Planetary Medicine, Gas Cycles, Population Explosion, Astronaut Jake Garn, Bumper Stickers

**Program 36: Your Stuff: Cars And Transportation**

*Our economy is based on the buying and selling of stuff. We want places to buy stuff, places to store stuff and places to use stuff. Moving your stuff ...*

Stuff, Car, Production, Resources, Stability, Energy Use, Entropy, Convenience, Gridlock, Utah Transit Authority, Environment, Air Pollution, Utah Growth, Leadership, Fuel Costs, Shopping Mall

**Program 37: Luck And Risk: Personal And Private Statistics**

*The luck of the draw, breaking your leg, a gun in your house, and your fears of cancer -- randomness, statistics, and luck ...*

Statistics, Who Wins? Media, Renting, Money, Credit, Debt, Home Equity Loans, Bell Curve, Insurance, Risk Perception, Car Deaths, Litigiousness

**Program 38: Medicine & Health -- Yours**

*What is the most important thing you need? Your medicine and health, this time,...*

Health Hypocrites, Health Fears,: Getting Shot, AIDS, Cancer, Bacteria; Lifestyle, Mental Attitude, Luck, Genes; Mobility, Mega-Cities, Public Health, Patient Empowerment

**Program 39: Creativity -- Yours**

*Leonardo da Vinci, Richard Feynman and you — what do you have in common? An enormous corpus callosum, the connection between your left and right brains, the basis for creativity....*

Richard Feynmann, Creativity, Art-Science, Rachel Carson - Writing, Art, Cartoon, Photography, William Kolff, Computer Graphics, Stephen Jacobsen, Thomas Stockham, Chi

**Program 40: Citizen Empowerment: Where Do We Go From Here?**

*Science Without Walls -- Science in Your World was a 40 program introduction -- the tip of the proverbial iceberg. What did we learn? What did we leave out? And where do we go from here? It's the final episode...*

Nature Of Science, Carl Sagan, Coverage, Heroes, Government, Responsible Citizenship, Democracy, Garbage Detection, Tolerance Window, Continuing Education, Videos, Thanks!