

**Regents Innovation Fund
INSTITUTIONAL SUPPORT FORM**

Proposal Title: Online LCE IDEaBook: Integrating LCE, Learning Styles, and Technology

Primary Institution: Arizona State University DEPT/Unit: Dept. Technology Management

Multi-Campus/University Projects
(check other campuses or universities participating)

ASU Tempe UA

ASU Polytechnic UA South

ASU West NAU

List other participating agencies:

Motorola, Honeywell, Boeing and other industry leaders

Google.com

Briefly describe the program and the development plan.

The focus of the proposed project is the creation of a multimedia learner-center knowledge community center called "LCE IDEaBook." The initial targeted recipients of the research in this study are faculty, who have the charge of creating the ASU Polytechnic Core curriculum, developed with the intent of portability across disciplines.

Funding Category

Indicate a primary (P) and, if applicable, secondary (S) funding category:

Professional Development S

Program or Course Development/Modification S

LCE Research P

Improved Assessment of Learning Outcomes S

Authorizations

Project Director

Signature: _____

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Official Authorized to Enter into Contractual Obligations

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Online LCE IDEaBook:

Part 1. Introduction

Arizona State University welcomed over 5,000 students at the Polytechnic campus this fall. According to President Michael Crow, it is the fastest growing campus at ASU (Crow, 2005). Arizona State University Polytechnic campus mission includes integrating practical and theoretical study, and engaging in research that emphasizes problem solving and knowledge that are applied (ASU, 2005). The mission includes the preparation of graduates to move directly into technical and professional careers, and to become ethical leaders on personal, public, and professional levels.

This year a Polytechnic Core Committee was formed to identify curriculum and thread technology throughout the campus. These courses will be available for all majors on all campuses in both computer-mediated classrooms or online. A Polytechnic Core Committee, consisting of ASU faculty and administration, was charged with defining the education on the Polytechnic campus. One of the driving forces behind the ASU Polytechnic Core is to address the needs of business, industry and communities in this region without losing the “academic bottom line” of the university. The quest for knowledge and the need to inspire people to think, ranks high in the academic agenda of university faculty. In order to accomplish these tasks, we need to partner with industry leaders to develop a mutually beneficial relationship between the human services paradigm and the business paradigm.

The online LCE IDEaBook project, presented in this proposal, uses graphic information technology as a means of integrating LCE and the learning styles of university students for high-enrollment general studies Polytechnic Core curriculum. We propose a virtual knowledge community center with integrated LCE and learning styles multimedia resources, linked to an online Website called the “LCE IDEaBook.” Although the project is initially geared toward the Polytechnic Core faculty, resources can be used by all Arizona university faculty, especially as the project grows. The Website will be composed of the following online LCE innovative modules: (1) thinking, (2) discovery, (3) learning, (4) application, and (5) assessment.

The IDEaLab and the Student Web Development Enterprise (SWDE) will maintain the online LCE IDEaBook, which are housed at the Polytechnic campus. The online resource will include “before LCE” and “after LCE” videos of teaching techniques, an ongoing collection of best practices of LCE redesigned modules, interactive tutorials on how to integrate LCE and learning styles, LCE workbook templates to download, discussion boards with ongoing LCE ideas, an LCE outcomes assessment tool, scholarly papers, and other resources. The LCE IDEaBook will focus on the thinking, discovery, learning, application, and assessment of LCE, utilizing computer-assisted classrooms or online delivery for the Polytechnic Core. The additional benefit of the LCE IDEaBook is that the contents can be applied to any other general education course with high demand at Northern Arizona University, University of Arizona, or ASU. The LCE IDEaBook will be accessible to faculty interested in learning how to apply LCE to their coursework and teaching methodology.

Objectives

The primary goal of the project is to create a virtual knowledge community center for professors to discover and implement learner-centered techniques in their coursework. The Arizona Board of Regents Website, which provides resources on LCE will be linked to the LCE IDEaBook.

The initial research will be directed on the Polytechnic Core curriculum, but the LCE IDEaBook will be set up to apply to all university coursework. The most significant goal of this proposal is for university professors, academic professionals, industry professionals, and students to collaborate to accomplish six key objectives:

- (1) identify and assess learning styles of a diverse group of university students;
- (2) discover, identify, and develop multimedia-teaching models to integrate LCE and specific learning styles in high-enrollment general education courses in the Polytechnic Core curriculum; this will immediately impact hundreds of students.
- (3) create collaborative and interdisciplinary face-to-face and e-teams consisting of a mixture of students, academics, and industry leaders, to problem solve using technological solutions;

- (4) develop best practices for using technology as a means of applying LCE teaching techniques in face-to-face and distance learning environments;
- (5) develop multimedia LCE prototypes;
- (6) provide a forum for germinating emerging ideas across all universities;
- (7) incorporate an outcomes assessment tool to be used to evaluate the success of the integrated Polytechnic Core modules;
- (8) distribute materials via the Internet to NAU, UA, and ASU faculty, learning centers, and distance education units through which the continued discovery and application of learner-centered approaches can be applied in the academe.

The pedagogical models utilized in this LCE IDEaBook will be constructed on the previous successful ABOR proposals, such as the tri-university "Faculty Development for Learner Centered Education." The content will provide models for faculty to apply to the Polytechnic Core, address specific course needs, and tools to implement the identified learning outcomes. Two short workshops will be offered to introduce faculty to the online resources through the Center for Learning and Teaching Excellence (CLTE).

The IDEaLab

The IDEaLab examines the role of human factors on innovation and technology management. It is interdisciplinary by nature and focuses on the human factor. The lab is dual in purpose and target market. It is both an innovative problem-solving lab, and a usability engineering research lab, which evaluates completed products. It is both a resource for academia at Arizona State University, as well as a resource for industry leaders and educators. The IDEaLab, an interdisciplinary content-independent lab at Arizona State University at the Polytechnic campus in Mesa, Arizona, was established as a response to the call to action report (NII, 2004), which requested university and industry partnerships. Industry leaders are an integral part of our Polytechnic campus and the IDEaLab. For this project they will actively participate in the think pods to contribute LCE application ideas to the Polytechnic Core curriculum.

The adoption and acceptance of information technology (IT) in our corporate and industrial culture, has resulted in the social construction of IT in the marketplace. The ASU Student Web Development Enterprise (SWDE) and the IDEaLab reflect that trend. Students will create the Web presence of the LCE IDEaBook, the interactive teaching modules, and the videography, under the direction of Dot Lestar and La Verne Abe Harris. Students from all disciplines at ASU Poly will be recruited by the principle investigators to participate in the IDEaLab think tanks, along with faculty, academic professionals, and industry leaders. Graduate assistants will help in collecting data and analysis from the research, as well as collecting information from the think tanks.

Part 2. Identification of Need

This project addresses the priorities established for this funding cycle because it offers resources for educators to integrate LCE and learning style models and apply them to the newly identified high-demand Polytechnic Core courses at the university level. Funding is needed for the LCE IDEaBook research, creation, collaboration, and development of assessment tools. This project supports the LCE initiative by conducting research in the integration of LCE and learning styles, for developing and implementing an LCE needs assessment model, and for building interactive teacher tutorials (LCE application and LCE usability assessment models) for distribution to ASU, UA, and NAU through the LCE IDEaBook. This LCE Research Grant addresses all four funding categories in the areas of:

- **Faculty development:** Deliverables: LCE IDEaBook and CDs with multimedia modules, workshops
- **Development or modifications of programs, courses, or course modules using LCE techniques:** Deliverable: A collection of case studies of LCE teaching methodologies, and prototypes of revised modules from the Polytechnic Core; A collection of ideas on how to apply the Polytechnic Core to the learning styles of the students from programs in each of the five proposed colleges (College of Science and Technology, College of Management and Innovation, School of Educational Innovation and Teacher Preparation, School of Health Sciences and Technologies, and College of Social Sciences and Humanities) (Jakubowski, 2005), integrating LCE with the different learning styles of the students; As professors develop the Polytechnic Core courses, new ideas for applying LCE to assignments and teaching methods will be added to the LCE IDEaBook.
- **LCE research:** Scholarly Paper topics to be delivered to professional conferences

• **Improved assessment of learning outcomes at the course or program level:** A multimedia outcomes assessment tool will be developed for faculty to measure their success in applying LCE to their coursework. It will be based on the “Matrix of Learning Outcomes for the Polytechnic Core” established by the Polytechnic Core Committee in August 2005 (Refer to the last two pages of this document). The IDEaLab will conduct a usability assessment of the LCE IDEaBook the final semester.

Educational Merit

This project is important to learner-centered education, because it takes an innovative approach to applying the pedagogy through technology-based solutions. It not only integrates learning styles with LCE, but incorporates three collaborative face-to-face and e-teams of students, university professors, academic professionals, and industry leaders for developing problem-solving techniques. The intended impact of the project will be significant on student learning, because the ideas not only can be applied to the Polytechnic Core, but to any other university curriculum. The proposed research by Drs. Harris, Humble, and Hirata will focus on innovative and creative problem solving through technology-based solutions. ABOR LCE funding would be used to pursue novel integrated LCE and learning styles research in the newly formed IDEaLab at Arizona State University. The goals are to be a catalyst for learner-centered education and to bring the industry together with academia to work as partners.

Impact of Project

Most university professors are experts in their fields, but have not been formally taught how to teach, which is an art in itself. With ABOR’s mantra of learner-centered education, professors must have more than just an awareness of teaching methodology. They must know how to apply it to their coursework. A student’s preferred learning style is determined by the manner in which he or she naturally processes, integrates, and retains information, and then applies these behaviors to learning. Recognizing learning styles and then having the tools to apply LCE to each learning style in a teaching module, creates the optimal opportunity for learning. This we hope to accomplish with the IDEaBook.

The proposed project will support faculty and student experience, the learning environment and the higher education institution through changing how core courses are taught. The 5,000 students on the Polytechnic campus will be the first to potentially benefit from the project—both directly and indirectly, since the pilot study will be focused on the Polytechnic Core curriculum. Students will be engaged in learner-centered activities through participation in the Polytechnic Core courses.

The LCE IDEaBook will support faculty development through integrating different multimedia approaches to illustrate content delivery of different learning styles. Faculty learning will include collaborative e-teams, problem-based learning, streaming media approaches, asynchronous online learning, individual thinking and discovery, innovative LCE best practices, outcomes assessment tools, and interactive tutorials. The university faculty, who are not directly involved in the implementation of the LCE IDEaBook, will be introduced to resources on how to apply LCE to their coursework through two workshops that will be offered at the culmination of the funding cycle. Industry leaders and academia will benefit through both the face-to-face and virtual relationships formed through this collaborative and interdisciplinary effort. Joint Alliance of Companies Managing Education for Technology (JACMET) will provide industry leaders from Boeing, Motorola, Honeywell, etc. as members of the IDEaLab think pods. Google.com leaders will also be partners in the IDEaLab to offer brainstorming and innovative thinking.

Previous funding has been granted to those redesigning courses with the LCE approach. This proposal is different because it offers tools, case studies, and best practices for faculty to redesign their own courses by creating an ongoing virtual knowledge community of ideas. It also offers a central location for LCE resources. This project will impact LCE beyond the faculty and students directly involved in the project, because it will be a transferable resource for all university faculty.

Part 3. Technical Needs

La Verne Abe Harris and Dot Lestar will oversee the support of the SWDE and the IDEaLab, GIT has a secure media server that will be used to store the digital information. The pre- and post-production work, authoring expertise, and Web design and development will come out of the SWDE and the IDEaLab. Most of the software needs are in place, except for one copy of video editing software and a survey software.

Part 4. Work Plan: LCE IDeaBook (Virtual knowledge community center)

	Tasks	Creative Process and Product Milestones	Human Capital	Time
Summer 2006:				
1	Planning Phase (ongoing)	<ul style="list-style-type: none"> • Developing the architecture and content of the LCE IDeaBook • Developing the strategy for the multimedia tutorials and assessment tool creation • Recruiting resource experts • Organizing the think tank teams • Planning the workshops • Coordinating the follow-up activities 	Harris Humble Hirata Grace (CLTE)	450 hrs. (est.)
2	Research (ongoing)	<ul style="list-style-type: none"> • Researching LCE and learning styles • Researching application to the Polytechnic Core • Gathering external resources for the Website • Case studies • Successful LCE modules • Best practices 	Harris Humble Hirata Graduate Asst.	500 hrs. (est.)
Fall 2006:				
3	Content Phase	<ul style="list-style-type: none"> • IDeaLab think pod meetings (3 teams) • e-teams formed • IDeaBook content assignments to discuss • All IDeaBook content will be written 	Content Team† Harris Humble Hirata Graduate Asst.	200 hrs. (est.)
Spring 2007:				
4	Creation Phase	<ul style="list-style-type: none"> • Multimedia tutorials • Videography • Online Website 	Tech Team*	250 hrs. (est.)
Summer 2007:				
5	Implementation and Outreach Phase	<ul style="list-style-type: none"> • Website will go live; CDs burned • LCE workshop will be conducted on campus to introduce faculty to the LCE IDeaBook and how to use it before the fall 2007 semester begins. • Virtual learning community will develop 	Tech Team* Grace (CLTE)	20 hrs. (est.)
Fall 2007:				
6	Follow-up	<ul style="list-style-type: none"> • Follow-up workshop • Revisit LCE pedagogical strategies with Polytechnic faculty • Collect additional content for the e-portfolios • The IDeaBook assessment • Usability revisions • Scholarly papers 	Grace (CLTE) Tech Team* Harris Humble Hirata Graduate Asst.	200 hrs. (est.)

†Content Team: industry leaders (JACMET and google), academics (Kleemann, Roen, Thomas), Poly students, led by Harris, Humble, and Hirata

*Technology Team: SWDE and IDeaLab student workers, lead by Harris and Lestar

Part 5. Key Personnel: LCE IDeaBook Project Directors

- PI: **La Verne Abe Harris, Ph.D.**, Asst. Professor of Graphic Information Technology LVHarris@asu.edu; 480.727.1105; [Note: Dr. Harris holds degrees in higher education and technology, graphic communications technology, commercial art, and art education. She has Arizona teaching certificates in both technology and art education (K-12 and community college), as well as having worked in industry for over 20 years as a computer graphic production manager, art director and creative director]
- Co-PI: **Jane Humble, Ph.D.**, Associate Professor of Operations Management Technology Jane.humble@asu.edu; 480.727.1304; [Note: Dr. Humble holds degrees in Mechanical and Industrial Engineering, and Business-Computer Information Systems]
- Co-PI: **Ernest T. Hirata, Ed.D.**, Associate Professor of Operations Management Technology Ernest.hirata@asu.edu; 480.727.1582 [Note: Dr. Hirata has a doctorate degree in education and is experienced in technology education and industrial training.]

Industry Leader Partners

- google.com
- Honeywell, Boeing, Motorola, Raytheon, Vaisala, Inc., Cybernetic Research Laboratories, and others

ASU Tempe Campus Partner

- Judy Grace, Ph.D. Center for Learning and Teaching Excellence (CLTE) Director

ASU Polytechnic Campus Partners

- Joseph Tidwell, President of Joint Alliance of Companies Managing Education for Technology (JACMET)
- Dot Lestar, Lecturer, Outcomes Assessment expert
- Duane Roen, Ph.D., Head, Humanities and Arts, East College, Arizona State University Chair, Polytechnic Core Committee
- Jeffrey Thomas, Clinical Asst. Professor and Psychologist, Department of Technology Management
- Gary Kleemann, Academic Professional, Distance Learning

Part 6. Performance Measures and Expected Outcomes

- Faculty attending the workshops will demonstrate an 80 percent increase in clear understanding of how to apply learner-centered techniques to their coursework by the end of the project. This outcome will be measured by a questionnaire given at the end of the CLTE faculty workshops. The data will be analyzed and the findings will be posted on the IDEaBook;
- An LCE course-assessment tool will be developed and posted on the Website for faculty to measure the success of applying the LCE and learning styles models into their Polytechnic Core coursework; faculty can then place the results in their Promotion and Tenure portfolios;
- The increase of LCE teaching strategies and awareness will be evident through the monitoring and updating of the LCE IDEaBook, and through follow-up communication, and evidence of increased application. Success of the outcome will be measured by a 50 percent increase in the online discussion forum, the collection of best practice examples, and the number of case studies added to the e-portfolio by the end of the project.

Dissemination of LCE IDEaBook Results

The LCE IDEaBook will be disseminated through presentations, conference proceedings, and scholarly journal articles from such professional conferences, as the American Society for Engineering Education (ASEE), National Association of Industrial Technology (NAIT), International Graphic Arts Education Association (IGAEA). The CLTE and the PIs will conduct two short workshops for faculty on the Polytechnic campus. They will distribute the URL of the LCE IDEaBook to faculty and learning centers at all three universities through e-mail announcements and printed postcards. Additional exposure will come through links on the IDEaLab Website, Arizona State University Website, and GIT eVision online newsletter. The future research in the IDEaLab is planned in the area of usability assessment of LCE online Polytechnic Core courses. This would provide an avenue to improve the quality of online courses and teach IDEaLab students the tools of usability engineering.

In Summary

The mission of the Arizona State University Polytechnic campus has shifted the pedagogy of the traditional “talking heads” lecture environment to that of a learner-centered and problem-based learning environment. This proposal focuses on developing ongoing ideas to apply LCE to the redesign of the newly selected Polytechnic Core curriculum, which will thread technology throughout the Polytechnic campus and be accessible for all Arizona State University students.

By incorporating the IDEaLab approach to problem solving, the Core curriculum can be transformed into transferable learning. Three collaborative think tanks consisting of interdisciplinary students, university professors, academic professionals, and industry leaders will gather innovative LCE redesign ideas that can be applied to the Polytechnic Core, as well as those that have been successfully implemented. The cross-disciplinary LCE IDEaBook will act as a virtual knowledge community clearinghouse.

References

- ASU (2005). Polytechnic campus Website. Available from: Arizona State University Website www.east.asu.edu/about/provost/presentations/polytechnic_core.html [cited Sept. 4, 2005].
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- NII (2004). Measuring innovation for national prosperity: Innovation framework, Report, January 2004, National Innovation Initiative. Available from: <http://www.ibm.com/ibm/publicaffairs/gp/innovframe2.pdf> [cited July 11, 2005].
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