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**Investing in the Future:
Building Institutional Leadership
For Natural Science Communities
Project Kaleidoscope Initiative
at
Mesa Community College
Mesa, Arizona
Year One of a Sustained Effort**

Introduction

Mesa Community College values learning. This is reflected in all of our strategic goals, but especially in our goal to provide quality instruction to enhance student learning. MCC has established scientific inquiry as one of our expected student outcomes. As is the case nationwide, MCC students have fallen short of our expectations in this area on our outcomes assessments. There is both a need and an opportunity to transform science education at MCC.

Mesa Community College (MCC) is the largest of 10 colleges in the Maricopa Community College District. We served nearly 28,000 students in the fall of 2004 on two campuses and via distance learning. Sixty-two percent of MCC students intend to transfer to university (mostly Arizona State University, which is within 6 miles), and 64% of ASU upper division students transfer credits from one of our colleges. Our students are older than traditional undergraduate population (average 26), 53% female, 34% nonwhite, and 63% part-time. Hispanics are currently 16% of our enrollment, however this group is experiencing unprecedented growth. The Hispanic population of Mesa grew 150% between 1990 and 2000, and now they comprise 30% of the Mesa Public Schools's enrollment. These data provide a picture of our student pipeline and suggest that we will soon be a significant Hispanic serving institution.

Natural Science Community Agenda for Improving STEM Education

The goal of our NSC is to promote the understanding and appreciation of science and technology by all students to enable them to be informed and productive citizens, professionals, and scientists of tomorrow. Our strategy will be to form a respected interdisciplinary group of science educators who will develop learning outcomes for our students regarding the nature of science and develop frameworks for achieving those learning outcomes. We will then make plans for implementing, assessing and disseminating these frameworks. Our scholarly approach will include collaborations with ASU and Project Kaleidoscope and will result in contributions to the scholarship of teaching and learning.

Our initial planning has secured administrative support from our Vice President for Academic Affairs who will also participate in our work. Our group will adopt the faculty learning community guidelines developed by Miami University Ohio and also employed

by our collaborators at the Arizona State University Center for Research on Education in Science, Mathematics, Engineering and Technology (CRESMET). We are focusing on a recognized need about which there should be consensus among the faculty and which parallels work underway at CRESMET. Having a common goal is key to success of any faculty learning community. We have selected faculty participants who are already recognized as leaders in their disciplines. We expect that the prestige of our group and the recognition we provide will increase the impact of the group and our ability to transform STEM education across our institution.

We plan to let the activities of our group develop from PKAL workshops and materials, from within our group, and from the leadership of our community director, faculty developer and a core group of faculty. We expect that after initial goal setting activities, we will read and discuss the literature, specify objectives and outcomes, develop and pilot some interdisciplinary curriculum modules, and assess their effectiveness with our students. Ultimately, we hope that we can impact institutionwide student outcomes.

Our interdisciplinary team includes members of the Life Science, Physical Science, Mathematics, Psychology, and Anthropology Departments. We also have a commitment for collaboration with CRESMET, which will include speakers, consultants, and assessment instruments. We will also take advantage of PKAL resources and consultancies to guide our work.

Our group will also benefit from and contribute to the Project Kaleidoscope in Two-Year Colleges initiative. Two of our members have been involved in this effort since the beginning. Most members of our group also participated in the recent NSF-funded conversation on What does it mean to be educated in the 21st Century. These efforts will give our group some significant momentum as we begin our efforts.

The core of our work will be conducted in biweekly meetings throughout the year, but we also propose to travel together to a series of PKAL events including:

Project Kaleidoscope National Colloquium

Translating How People Learn into a Roadmap for Institutional Transformation

Kansas City Marriott Country Club Plaza & the Stowers Institute for Medical

Research, Kansas City, Missouri

September 30 - October 2, 2005

The PKAL National Colloquium will address how advances in the cognitive and learning sciences inform us about how people learn and how such information and data might guide the work of academic leadership responsible for shaping the undergraduate STEM learning environment.

Project Kaleidoscope Leadership Seminars

Leadership in Building Programs that Ensure the Success of All Students

Trinity University, San Antonio, Texas

February 24 - 26, 2006

The leadership seminar at Trinity University will examine the work of individuals, departments and institutions proven to be effective with students from groups currently under-represented in the study and practice of science. They will explore approaches to building and nurturing a campus culture in which diversity within the community of science (students and faculty alike) is sought and respected. As with all Leadership Seminars, PKAL will be addressing the individual and team leadership skills necessary to design and sustain interdisciplinary learning environments.

PKAL F21 National Assembly

2006 PKAL F21 National Assembly: Coming together to strengthen student learning in STEM

Chicago, Illinois

Date TBD

The overarching theme for this assembly is "Coming Together to Transform Student Learning in the Fields of Science, Technology, Engineering and Mathematics." This theme sets the stage for exploring the many ways STEM faculty and disciplines, institutions of education at all levels, corporations, museums and other informal science entities are "coming together" to build and enhance 21st century communities of learners. More information on the 2006 F21 National Assembly will be coming soon.

Our Vision of Success in Achieving our Goal

We envision that as a result of our activities our students will have a greater understanding and appreciation of the nature science and technology. Our expected student outcomes will be documented and integrated into our institutional assessments. We will document our curriculum modules and disseminate them. We will have evidence of the effectiveness of our new curriculum in our pilot projects and ultimately evidence of their impact institutionwide.

Our intention throughout will be to encourage a scholarly approach to our goal. Consequently, the products of our work should be presented locally and at professional meetings. We envision that we will collaborate to develop presentations that individual faculty could present wherever possible. We will publish our work in disciplinary and educational journals.

We will also assess the efficacy of our faculty learning community approach. We expect that a new level of interdisciplinary interaction will be achieved and that we will achieve a critical mass for the transformation of STEM education at MCC. We will document the increase in our collaborations with ASU and with professional societies and organizations like Project Kaleidoscope. We expect that our success could expand our approach to faculty development

Natural Science Community Team

The major strength of the leadership community we are developing is the quality of the faculty chosen to participate. Through our interdisciplinary collaboration, we expect to multiply our individual accomplishments.

This community developed from a core group of faculty leaders who gained the support of Vice President for Academic Affairs Gail Mee. Other participants from STEM disciplines were chosen based on their current involvement in science education and ability to contribute to this community.

Brad Kincaid – Community Director
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Brad has been at Mesa Community College for fifteen years where he just completed a six year stint as Department Chair. Soon after arriving at MCC, he led the implementation of inquiry teaching methods in an introductory biology course for nonmajors, which was recognized as a Project Kaleidoscope Program That Works. In 1995, he was nominated to the Project Kaleidoscope Faculty for the 21st Century and remains an active member. He has conducted educational research on inquiry instruction and on the use of computer simulations to enhance laboratory instruction. During the past year while on sabbatical, Brad has completed a three-year study of the relationship of alternative assessments (online quizzes, concept maps and essay exams) to student perceptions of their learning. He has also chaired a group within Project Kaleidoscope to form a network of two-year college science and math faculty to address educational reform issues within this rapidly growing sector of higher education. Most recently, Brad has joined the Project Pathways MSP team centered at Arizona State University to produce a research-based and tested model for enhancing instruction of mathematics and science in grades 9-12.

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Liz Dorland currently teaches chemistry at Mesa Community College, a part of the Maricopa County Community College District. She has taught in the MCCCDC in the metropolitan Phoenix area since 1985. Liz's teaching career includes more than 30 years of service at several community colleges, colleges and universities in the eastern and western United States. From August 2003 to August 2004, Liz served as a program director in the Division of Undergraduate Education at the National Science Foundation, working with the ATE, STEP, NDSL and CCLI programs. Her professional interests include the use and study of molecular visualization and animations for teaching chemical concepts, computer interfaced laboratory experiments, online delivery of course materials using WebCT, digital video projects prepared by students, active learning strategies, and the biological basis of learning. Liz holds a B.S. in chemistry from Kansas State University and an M.S. in organic chemistry from the University of California at Berkeley.

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