Annual Report for Period: 07/2011 - 06/2012
Submitted on: 03/06/2012
Principal Investigator: Filowitz, Mark S.
Award ID: 0757113
Organization: Cal State U Fullerton Fdn
Submitted By:
Filowitz, Mark - Principal Investigator
Title:
TEST UP: Talent Expansion in Science and Technology - An Urban Partnership

Project Participants

Senior Personnel

Name: Bonsangue, Martin
Worked for more than 160 Hours: Yes
Contribution to Project:
Dr. Marty Bonsangue is a Professor of Mathematics at CSU Fullerton. Dr. Bonsangue is a recognized national leader in mathematics education and a strong proponent of supplemental instruction. He is strongly involved with implementing and evaluating the SI portion of the project and in leading SI coordination efforts among the three institutions. Dr. Bonsangue is a member of the TEST:UP Coordinating Council and and Implementation Team. His work on the project is supported by NSF resources.

Name: Redinger, Larry
Worked for more than 160 Hours: Yes
Contribution to Project:
Larry Redinger is Dean of the Natural Science Division and Professor of Geology at Mt San Antonio College. He is Co-Principal Investigator and Co-Project Director. Dean Redinger is a member of the TEST:UP Coordinating Council and is responsible for project management at Mt. San Antonio College.

Name: Woods, Rochelle
Worked for more than 160 Hours: Yes
Contribution to Project:
Dr. Rochelle Woods is the Assistant Dean for the College of Natural Sciences and Mathematics at CSU Fullerton. Dr. Woods is a Co-Principal Investigator and Co-Project Diretor. She works particularly closely with the Coordinator for Student Transfer Services. Dr. Woods is a member of the TEST:UP Coordinating Council and Implementation Team.

Name: Comeau, Carol
Worked for more than 160 Hours: Yes
Contribution to Project:
Carol Comeau is Dean of the Division of Science, Math and Health Sciences at Santa Ana College. She is Co-Principal Investigator and Co-Project Director. Dean Comeau is a member of the TEST:UP Coordinating Council and is responsible for project management at Santa Ana College.

Name: Filowitz, Mark
Worked for more than 160 Hours: Yes
Contribution to Project:
Dr. Mark S. Filowitz, a physical chemist, is Associate Dean for the College of Natural Sciences and Mathematics and has been the PI for the NSF-STEP grant since 2009 when Dr. Murray was named Vice President for Academic Affairs. Prior to that he was very involved with the program and engaged in similar activities under a subcontract from Citrus College.

Name: Infante, Nicole
Worked for more than 160 Hours: Yes
Contribution to Project:
Dr. Infante is an Assistant Professor in Mathematics. She is working with Ms. Lewis to implement a new supplementary instruction program in selected entry level mathematics courses. Dr. Infante attended the University of Missouri Kansas City SI workshop and trains the peer SI leaders for the SI workshops associated with the targeted courses. NSF funds were used to support Dr. Infante's travel to the workshop.

Name: Lewis, Kathy

Worked for more than 160 Hours: Yes

Contribution to Project:

Ms. Lewis is longtime full-time lecturer in Mathematics. She is working with Dr. Infante to implement a new supplementary instruction program in selected entry level mathematics courses. Ms. Lewis attended the University of Missouri Kansas City SI workshop and trains the peer SI leaders for the SI workshops associated with the targeted courses. NSF funds were used to support Ms. Lewis' travel to the workshop.

Name: Walker, Sean

Worked for more than 160 Hours: Yes

Contribution to Project:

Dr. Walker is an Associate Professor of Biological Science. He is a member of the College retention committee, assists in collecting project data and in developing and carrying out project evaluation protocols, and oversees implementation of programs to improve student learning and performance in entry level gateway courses in the biological sciences. He receives released time from teaching duties and one month summer salary from NSF funds to carry out these activities.

Name: Filowitz, Mark

Worked for more than 160 Hours: Yes

Contribution to Project:

Associate Dean Mark Filowitz is strongly involved in retention efforts for math and science majors and is playing a leadership role in our project. He is an ad hoc member of the internal and external advisory committees, works with the Coordinator for Transfer Student Services, and is co-PI on grants with Citrus College to provide enhanced STEM advisement and summer research experiences.

Post-doc

Graduate Student

Name: Bowling, Mellisa

Worked for more than 160 Hours: No

Contribution to Project:

Undergraduate Student

Technician, Programmer

Name: Garcia, Gina

Worked for more than 160 Hours: Yes

Contribution to Project:

Ms. Garcia holds a MA degree from the University of Maryland. She worked during the first year on the project as the Coordinator for STEM Transfer Student Services. In this role, Ms. Garcia traveled three to four days a week to Mt. SAC and SAC to carry out advisement and engagement activities. She worked in conjunction with TEST:UP's two half-time STEM advisers to carry out project activities. Ms. Garcia also plans and implements educational support services for transfer students in STEM majors at Cal State Fullerton and supervises four peer advisors. Ms. Garcia's salary is fully supported by NSF. She left the program in September 2009 to pursue doctoral studies at UCLA.

Name: Flores, Oscar

Worked for more than 160 Hours: Yes

Contribution to Project:

Oscar serves as the STEM Counselor at MT. SAC. The community college part-time counselor provide academic advisement and support to students interested in transferring to four-year universities in STEM majors. Oscar helps student develop an academic plan focused on completing math and science requirements necessary to transfer. Oscar also works collaboratively with the Coordinator for STEM Transfer Student Services.

Name: Camacho, Tammy

Worked for more than 160 Hours: Yes

Contribution to Project:

Ms. Camacho serves as the STEM Counselor at Santa Ana College (SAC). She has worked with faculty mentors to establish guidelines for mentoring from both the student and faculty perspective. She is interfacing with other departments to recruit students into the major. Her participation has extended to Science Career Day at California State University, Fullerton (spring 2009) which facilitated SAC student attendance. Ms. Camacho is meeting with STEM students and assisting with their enrollment. There have been multiple recruitment events this spring which she has organized.

Name: Fernandez-Weston, Cathy

Worked for more than 160 Hours: Yes

Contribution to Project:

Cathy has replaced Gina Garcia as the Coordinator for STEM Transfer Student Services in summer 2009. She holds an MA degree from Virginia Tech University. She works on the project as the Coordinator for STEM Transfer Student Services. In this role, Ms. Fernandez-Weston travels three to four days a week to Mount San Antonio College and Santa Ana College to carry out advisement and engagement activities. She works in conjunction with TEST:UP's two half-time STEM advisers to carry out project activities. Ms. Fernandez-Weston also plans and implements educational support services for transfer students in STEM majors at Cal State Fullerton and supervises four peer advisors. Ms. Fernandez-Weston's salary is fully supported by NSF.

Name: Lopez, Ricardo

Worked for more than 160 Hours: Yes

Contribution to Project:

Ricardo is overseeing aspects of the CSUF freshmen retention program and assists with new student orientation for CSUF math and science majors. He is serving a similar role as a Coordinator for STEM Transfer Student Services at another community college. His direct involvement for this project is 25% time. His involvement at our neighboring community college (Citrus College) is 75% time and funded by a U.S. Department of Education grant to Citrus College. Ricardo also is playing a role in creating research opportunities for Citrus college students, who come to CSUF during the summer to work with math and science faculty. The summer research program is also funded by the U.S. Department of Education grant to Citrus College. This has created a synergy between the U.S. Department of Education funded program at Citrus, which targets STEM students, and our NSF program.

Name: Sheldon, Joel

Worked for more than 160 Hours: Yes

Contribution to Project:

Joel is serving as a math center specialist at Santa Ana College

Name: Moon, Hye Sun

Worked for more than 160 Hours: No

Contribution to Project:

Provides institutional research data for CSUF for the grant.

Name: Sullivan, Edward

Worked for more than 160 Hours: No

Contribution to Project:

Provides institutional research data for CSUF for the grant.

Name: Hershey, James

Worked for more than 160 Hours: No

Contribution to Project:

Provides institutional research data for CSUF for the grant.

Other Participant

Name: Gilmartin, Shannon

Worked for more than 160 Hours: No

Contribution to Project:

Dr. Gilmartin is a research scientist and independent consultant. She is the external evaluator for the project and is involved in designing and implementing evaluation procedures for all program elements. Dr. Gilmartin bills for work performed hourly at the rate of $110 per hour and her work is supported by NSF funds. She typically works less than 160 hours per year on the project.

Name: Malanga, Robert

Worked for more than 160 Hours: Yes

Contribution to Project:

Robert serves as a CSUF peer advisor. Peer advisors assist the Coordinator for STEM Transfer Student Services in planning and implementing educational support services for transfer students in STEM majors at Cal State Fullerton. Peer advisors also provide outreach and support to community college students interested in STEM majors.

Name: Hernandez, Francesca

Worked for more than 160 Hours: Yes

Contribution to Project:

Francesca serves as a CSUF Peer Advisor. Peer advisors assist the Coordinator for STEM Transfer Student Services in planning and implementing educational support services for transfer students in STEM majors at Cal State Fullerton. Peer advisors also provide outreach and support to community college students interested in STEM majors.

Name: Smith, Matthew

Worked for more than 160 Hours: Yes

Contribution to Project:

Matthew serves as a CSUF peer advisor. Peer advisors assist the Coordinator for STEM Transfer Student Services in planning and implementing educational support services for transfer students in STEM majors at Cal State Fullerton. Peer advisors also provide outreach and support to community college students interested in STEM majors.

Name: Gamboa, Raziel

Worked for more than 160 Hours: Yes

Contribution to Project:

Raziel serves as a CSUF peer advisor. Peer advisors assist the Coordinator for STEM Transfer Student Services in planning and implementing educational support services for transfer students in STEM majors at Cal State Fullerton. Peer advisors also provide outreach and support to community college students interested in STEM majors.

Name: Nguyen, Annie

Worked for more than 160 Hours: Yes

Contribution to Project:

Ms. Nguyen assists the Coordinator for STEM Transfer Student Services in planning and implementing educational support services for transfer students in STEM majors at Cal State Fullerton. She is responsible for managing the STEM Transfer office and tracks all student participation in TEST:UP programs.

Name: Macias, Carlos

Worked for more than 160 Hours: No

Contribution to Project:

Carlos is a Mount San Antonio College student serving as a peer facilitator/mentor

Name: Grevedon, Michelle

Worked for more than 160 Hours: Yes

Contribution to Project:

Michelle is participating as a CSUF peer advisor and mentor. Peer advisors assist the Coordinator for STEM Transfer Student Services in planning and implementing educational support services for transfer students in STEM majors at Cal State Fullerton. Peer advisors also provide outreach and support to community college students interested in STEM majors.

Name: Lui, Weilin

Worked for more than 160 Hours: Yes

Contribution to Project:

Weilin is participating as a CSUF peer advisor and mentor. Peer advisors assist the Coordinator for STEM Transfer Student Services in planning and implementing educational support services for transfer students in STEM majors at Cal State Fullerton. Peer advisors also provide outreach and support to community college students interested in STEM majors.

Name: Hana, Jeremy

Worked for more than 160 Hours: No

Contribution to Project:

Jeremy is participating as a CSUF peer advisor and mentor. Peer advisors assist the Coordinator for STEM Transfer Student Services in planning and implementing educational support services for transfer students in STEM majors at Cal State Fullerton. Peer advisors also provide outreach and support to community college students interested in STEM majors.

Name: Govindarajan, Karthikeyan

Worked for more than 160 Hours: No

Contribution to Project:

Karthikeyan serves as a CSUF peer advisor. Peer advisors assist the Coordinator for STEM Transfer Student Services in planning and implementing educational support services for transfer students in STEM majors at Cal State Fullerton. Peer advisors also provide outreach and support to community college students interested in STEM majors.

Name: Krahl, Carolyn

Worked for more than 160 Hours: Yes

Contribution to Project:

Carolyn is a Santa Ana College student serving as a peer facilitator/mentor

Name: Lee, Al

Worked for more than 160 Hours: Yes

Contribution to Project:

Al is a Santa Ana College student serving as a peer facilitator/mentor

Name: Hillis, David

Worked for more than 160 Hours: Yes

Contribution to Project:

David is a Santa Ana College student serving as a peer facilitator/mentor

Name: Nguyen, Yen

Worked for more than 160 Hours: Yes

Contribution to Project:

Yen is a Santa Ana College student serving as a peer facilitator/mentor

Name: Nguyen, Vi

Worked for more than 160 Hours: Yes

Contribution to Project:

Vi is a Santa Ana College student serving as a peer facilitator/mentor

Name: Caporal, Nicole

Worked for more than 160 Hours: Yes

Contribution to Project:

Nicole is a Santa Ana College student serving as a peer facilitator/mentor

Name: Weir, Elizabeth

Worked for more than 160 Hours: Yes

Contribution to Project:

Elizabeth is a Santa Ana College student serving as a peer facilitator/mentor

Name: Black, Nerissa

Worked for more than 160 Hours: Yes

Contribution to Project:

Nerissa is a Santa Ana College student serving as a peer facilitator/mentor

Name: Miller, John

Worked for more than 160 Hours: Yes

Contribution to Project:

John is a Santa Ana College student serving as a peer facilitator/mentor

Name: Tran, Thien
Worked for more than 160 Hours: Yes
Contribution to Project:
Thien is a Santa Ana College student serving as a peer facilitator/mentor

Name: Nejad, Iraj
Worked for more than 160 Hours: Yes
Contribution to Project:
Mt. San Antonio College

Name: Huang, Kenny
Worked for more than 160 Hours: No
Contribution to Project:
Mt. San Antonio College

Name: Revell, Tim
Worked for more than 160 Hours: No
Contribution to Project:
Mt. San Antonio College

Name: Cooper, Mark
Worked for more than 160 Hours: No
Contribution to Project:
Mt. San Antonio College

Name: Newman, Charlie
Worked for more than 160 Hours: No
Contribution to Project:
Mt. San Antonio College

Name: Walker, Rebecca
Worked for more than 160 Hours: No
Contribution to Project:
Mt. San Antonio College

Name: Sholars, Joan
Worked for more than 160 Hours: No
Contribution to Project:
Mt. San Antonio College

Name: Tatoian, Vahe
Worked for more than 160 Hours: No
Contribution to Project:
Mt. San Antonio College

Name: Mason, Martin
Worked for more than 160 Hours: No
Contribution to Project:
Mt. San Antonio College

Name: Nguyen, BaoChi
Worked for more than 160 Hours: No
Contribution to Project:
Mt. San Antonio College

Name: Hosea, Phobe

Worked for more than 160 Hours: No
Contribution to Project:
Mt. San Antonio College

Name: Anderson, Daniel
Worked for more than 160 Hours: No
Contribution to Project:
Mt. San Antonio College

Name: Rickard, Malcom
Worked for more than 160 Hours: No
Contribution to Project:
Mt. San Antonio College

Name: Aguilar, Nancy
Worked for more than 160 Hours: No
Contribution to Project:
Mt. San Antonio College

Name: Treiber, Danielle
Worked for more than 160 Hours: No
Contribution to Project:
Mt. San Antonio College

Name: Chavorin, Yvonne
Worked for more than 160 Hours: No
Contribution to Project:
Mt. San Antonio College

Name: Jou, YuoChing
Worked for more than 160 Hours: No
Contribution to Project:
Mt. San Antonio College

Name: Eiman, Joann
Worked for more than 160 Hours: No
Contribution to Project:
Mt. San Antonio College

Name: Aden, Bronson
Worked for more than 160 Hours: Yes
Contribution to Project:
Bronson is a Mt. San Antonio College student serving as a peer facilitator/mentor

Name: Arrua, Alicia
Worked for more than 160 Hours: Yes
Contribution to Project:
Alicia is a Mt. San Antonio College student serving as a peer facilitator/mentor

Name: Corea, Kenny
Worked for more than 160 Hours: Yes
Contribution to Project:
is a student serving as a peer facilitator/mentor at Mt. San Antonio College

Name: Cosio, Chris
Worked for more than 160 Hours: Yes
Contribution to Project:

is a student serving as a peer facilitator/mentor at Mt. San Antonio College

Name: Dodge, Sarah
Worked for more than 160 Hours: Yes
Contribution to Project:
Sarah is a Mt. San Antonio College student serving as a peer facilitator/mentor

Name: Don, William
Worked for more than 160 Hours: Yes
Contribution to Project:
William is a Mt. San Antonio College student serving as a peer facilitator/mentor

Name: Fallon, Madison
Worked for more than 160 Hours: Yes
Contribution to Project:
Madison is a Mt. San Antonio College student serving as a peer facilitator/mentor

Name: Fard, Kayvan
Worked for more than 160 Hours: Yes
Contribution to Project:
Kayvan is a Mt. San Antonio College student serving as a peer facilitator/mentor

Name: Ganji, Bardia
Worked for more than 160 Hours: Yes
Contribution to Project:
Bardia is a Mt. San Antonio College student serving as a peer facilitator/mentor

Name: Ho, Ying Hsing
Worked for more than 160 Hours: Yes
Contribution to Project:
Ying Hsingis a Mt. San Antonio College student serving as a peer facilitator/mentor

Name: Le, Vivian
Worked for more than 160 Hours: Yes
Contribution to Project:
Vivian is a Mt. San Antonio College student serving as a peer facilitator/mentor

Name: Lo, Chris
Worked for more than 160 Hours: Yes
Contribution to Project:
is a student serving as a peer facilitator/mentor at Mt. San Antonio College

Name: Quintero, Catalina
Worked for more than 160 Hours: Yes
Contribution to Project:
Catalina is a Mt. San Antonio College student serving as a peer facilitator/mentor

Name: Sun, Jackie
Worked for more than 160 Hours: Yes
Contribution to Project:
is a student serving as a peer facilitator/mentor at Mt. San Antonio College

Name: Velasco, Zulema
Worked for more than 160 Hours: Yes
Contribution to Project:
Zulema is a Mt. San Antonio College student serving as a peer facilitator/mentor

Name: Ryou, Joohee

Worked for more than 160 Hours: Yes

Contribution to Project:

is a student serving as a peer facilitator/mentor at Santa Ana College

Name: Sanchez, Wendy

Worked for more than 160 Hours: Yes

Contribution to Project:

is a student serving as a peer facilitator/mentor at California Santa Ana College

Name: Uribe, Brandon

Worked for more than 160 Hours: Yes

Contribution to Project:

Brandonis a Santa Ana College student serving as a peer facilitator/mentor

Name: Kuzucan, Aida

Worked for more than 160 Hours: Yes

Contribution to Project:

is a student serving as a peer facilitator/mentor at Santa Ana College

Name: Ho, Thanh

Worked for more than 160 Hours: Yes

Contribution to Project:

Sis a student serving as a peer facilitator/mentor at Santa Ana College

Name: Lo, Long

Worked for more than 160 Hours: Yes

Contribution to Project:

Long is a Santa Ana College student serving as a peer facilitator/mentor

Name: Trinh, Lien

Worked for more than 160 Hours: Yes

Contribution to Project:

is a student serving as a peer facilitator/mentor at Santa Ana College

Name: Meas, Sokennrey

Worked for more than 160 Hours: Yes

Contribution to Project:

is a student serving as a peer facilitator/mentor at Santa Ana College

Name: Hernandez, Carlos

Worked for more than 160 Hours: Yes

Contribution to Project:

is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Zambrano, Adalberto

Worked for more than 160 Hours: Yes

Contribution to Project:

is a student serving as a peer facilitator/mentor at Santa Ana College

Name: Carrillo, Mckenzie

Worked for more than 160 Hours: Yes

Contribution to Project:

is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Bhakta, Khushbu

Worked for more than 160 Hours: Yes

Contribution to Project:

is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Blackford, Nick
Worked for more than 160 Hours: Yes
Contribution to Project:
is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Coney, Ruth
Worked for more than 160 Hours: Yes
Contribution to Project:
is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Ngo, Duy Dinh Ho
Worked for more than 160 Hours: Yes
Contribution to Project:
is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Eillis, Eden
Worked for more than 160 Hours: Yes
Contribution to Project:
is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Huang, Li-Hsuan
Worked for more than 160 Hours: No
Contribution to Project:
is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Kaye, Adelina
Worked for more than 160 Hours: No
Contribution to Project:
is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Khadige, Rita
Worked for more than 160 Hours: No
Contribution to Project:
is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Lenders, Daniel
Worked for more than 160 Hours: No
Contribution to Project:
is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Maglione, Josh
Worked for more than 160 Hours: No
Contribution to Project:
is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Odom, Lucy
Worked for more than 160 Hours: No
Contribution to Project:
is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Park, Kevin
Worked for more than 160 Hours: No
Contribution to Project:
California State University Fullerton

Name: Ramirez, Jessica

Worked for more than 160 Hours: No

Contribution to Project:

is a student serving as a peer facilitator/mentor atCalifornia State University, Fullerton

Name: Razo, Mario

Worked for more than 160 Hours: No

Contribution to Project:

is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Cheim, Kevin

Worked for more than 160 Hours: No

Contribution to Project:

is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Dave, Noopur

Worked for more than 160 Hours: No

Contribution to Project:

is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Ghasemian, Reza

Worked for more than 160 Hours: No

Contribution to Project:

is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Gluckman, Emanuel

Worked for more than 160 Hours: No

Contribution to Project:

is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Helwani, Sirene

Worked for more than 160 Hours: No

Contribution to Project:

is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Jones, Jarrett

Worked for more than 160 Hours: No

Contribution to Project:

is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Ortiz, Erick

Worked for more than 160 Hours: No

Contribution to Project:

is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Perusse, Dean

Worked for more than 160 Hours: No

Contribution to Project:

is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Sandoval, Hector

Worked for more than 160 Hours: No

Contribution to Project:

is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Sandu, Jonathan

Worked for more than 160 Hours: No

Contribution to Project:

is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Schroeder, Matthew
Worked for more than 160 Hours: No
Contribution to Project:
is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Siracusa, Matthew
Worked for more than 160 Hours: No
Contribution to Project:
is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Tabel, Ibrahim
Worked for more than 160 Hours: No
Contribution to Project:
is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Torres, Joselyn
Worked for more than 160 Hours: No
Contribution to Project:
is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Velasco, Beth
Worked for more than 160 Hours: No
Contribution to Project:
is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Vu, Tammy
Worked for more than 160 Hours: No
Contribution to Project:
is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Malanga, Robert
Worked for more than 160 Hours: No
Contribution to Project:
is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Shuman, Elizabeth
Worked for more than 160 Hours: No
Contribution to Project:
is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Garcia, Lisa
Worked for more than 160 Hours: No
Contribution to Project:
is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Woelm, Angela
Worked for more than 160 Hours: No
Contribution to Project:
is a student serving as a peer facilitator/mentor at California State University, Fullerton

Name: Cyrs, Asha
Worked for more than 160 Hours: Yes
Contribution to Project:
Ms. Cyrsassists the Coordinator for STEM Transfer Student Services in planning and implementing educational support services for transfer students in STEM majors at Cal State Fullerton. She is responsible for managing the STEM Transfer office and tracks

all student participation in TEST:UP programs.

Name: Jozavi, Kurosh

Worked for more than 160 Hours: Yes

Contribution to Project:

Kurosh serves as a California State University, Fullerton peer advisor. Peer advisors assist the Coordinator for STEM Transfer Student Services in planning and implementing educational support services for transfer students in STEM majors at Cal State Fullerton. Peer advisors also provide outreach and support to community college students interested in STEM majors.

Name: Lo, Crystal

Worked for more than 160 Hours: Yes

Contribution to Project:

Crystal serves as a California State University, Fullerton peer advisor. Peer advisors assist the Coordinator for STEM Transfer Student Services in planning and implementing educational support services for transfer students in STEM majors at Cal State Fullerton. Peer advisors also provide outreach and support to community college students interested in STEM majors.

Name: Noland, Jesus

Worked for more than 160 Hours: Yes

Contribution to Project:

Jesus serves as a California State University, Fullerton peer advisor. Peer advisors assist the Coordinator for STEM Transfer Student Services in planning and implementing educational support services for transfer students in STEM majors at Cal State Fullerton. Peer advisors also provide outreach and support to community college students interested in STEM majors.

Name: Zafra, Robin

Worked for more than 160 Hours: Yes

Contribution to Project:

Robin serves as a California State University, Fullerton peer advisor. Peer advisors assist the Coordinator for STEM Transfer Student Services in planning and implementing educational support services for transfer students in STEM majors at Cal State Fullerton. Peer advisors also provide outreach and support to community college students interested in STEM majors.

Name: Lindsey, Lewis

Worked for more than 160 Hours: No

Contribution to Project:

California State University, Fullerton

Name: Sadrarhami, Samira

Worked for more than 160 Hours: No

Contribution to Project:

California State University, Fullerton

Name: Tran, Thao

Worked for more than 160 Hours: Yes

Contribution to Project:

Thao is a Santa Ana College student serving as a peer facilitator/mentor

Name: Ramirez, Stephanie

Worked for more than 160 Hours: Yes

Contribution to Project:

Stephanie is a Santa Ana College student serving as a peer facilitator/mentor

Name: Thompson, Casey

Worked for more than 160 Hours: Yes

Contribution to Project:

Casey is a Santa Ana College student serving as a peer facilitator/mentor

Name: Wilkins, Alexandria

Worked for more than 160 Hours: Yes

Contribution to Project:

Alexandria is a Santa Ana College student serving as a peer facilitator/mentor

Name: Tran, David
Worked for more than 160 Hours: Yes
Contribution to Project:
David is a Santa Ana College student serving as a peer facilitator/mentor

Name: Voss, Nick
Worked for more than 160 Hours: Yes
Contribution to Project:
Nick is a Santa Ana College student serving as a peer facilitator/mentor

Name: Boada, Patrick
Worked for more than 160 Hours: Yes
Contribution to Project:
Patrick is a Mt. San Antonio College student serving as a peer facilitator/mentor

Name: Corea, Kenneth
Worked for more than 160 Hours: Yes
Contribution to Project:
Kenneth is a Mt. San Antonio College student serving as a peer facilitator/mentor

Name: Cosio, Christopher
Worked for more than 160 Hours: Yes
Contribution to Project:
Christopher is a Mt. San Antonio College student serving as a peer facilitator/mentor

Name: Cui, Herman
Worked for more than 160 Hours: Yes
Contribution to Project:
Herman is a Mt. San Antonio College student serving as a peer facilitator/mentor

Name: Fnu, Jeffry
Worked for more than 160 Hours: Yes
Contribution to Project:
Jeffry is a Mt. San Antonio College student serving as a peer facilitator/mentor

Name: Lo, Christopher
Worked for more than 160 Hours: Yes
Contribution to Project:
Christopher is a Mt. San Antonio College student serving as a peer facilitator/mentor

Name: Sun, Jacqueline
Worked for more than 160 Hours: Yes
Contribution to Project:
Jacqueline is a Mt. San Antonio College student serving as a peer facilitator/mentor

Name: Adem, Manar
Worked for more than 160 Hours: Yes
Contribution to Project:
Manar is participating as a CSUF peer advisor and mentor. Peer advisors assist the Coordinator for STEM Transfer Student Services in planning and implementing educational support services for transfer students in STEM majors at Cal State Fullerton. Peer advisors also provide outreach and support to community college students interested in STEM majors.

Name: Nieto, Manuel
Worked for more than 160 Hours: Yes
Contribution to Project:

Manuel is participating as a CSUF peer advisor and mentor. Peer advisors assist the Coordinator for STEM Transfer Student Services in planning and implementing educational support services for transfer students in STEM majors at Cal State Fullerton. Peer advisors also provide outreach and support to community college students interested in STEM majors.

Name: Singh Gill, Harpreet

Worked for more than 160 Hours: Yes

Contribution to Project:

Harpreet is participating as a CSUF peer advisor and mentor. Peer advisors assist the Coordinator for STEM Transfer Student Services in planning and implementing educational support services for transfer students in STEM majors at Cal State Fullerton. Peer advisors also provide outreach and support to community college students interested in STEM majors.

Name: Valention, Summer

Worked for more than 160 Hours: No

Contribution to Project:

Summer is participating as a CSUF peer advisor and mentor. Peer advisors assist the Coordinator for STEM Transfer Student Services in planning and implementing educational support services for transfer students in STEM majors at Cal State Fullerton. Peer advisors also provide outreach and support to community college students interested in STEM majors.

Name: Dang, Anh

Worked for more than 160 Hours: No

Contribution to Project:

Dang is a Mt. San Antonio College student serving as a peer facilitator/mentor

Name: Dominguez, Catalina

Worked for more than 160 Hours: No

Contribution to Project:

Supports Biology resource center at Mt.San Antonio

Name: Kuo, Chia

Worked for more than 160 Hours: No

Contribution to Project:

Kuo is a Mt. San Antonio College student serving as a peer facilitator/mentor

Name: Rice, Cristy

Worked for more than 160 Hours: No

Contribution to Project:

Supports Biology resource center at Mt.San Antonio

Name: Kim, Se Wan

Worked for more than 160 Hours: No

Contribution to Project:

Supports Biology resource center at Mt.San Antonio

Name: Hunter, Alexander

Worked for more than 160 Hours: No

Contribution to Project:

Hunter is a Mt. San Antonio College student serving as a peer facilitator/mentor

Name: Elkins, Nicholas

Worked for more than 160 Hours: No

Contribution to Project:

Elkins is a Mt. San Antonio College student serving as a peer facilitator/mentor

Name: Doo, Ammar

Worked for more than 160 Hours: No

Contribution to Project:

Doo is a Mt. San Antonio College student serving as a peer facilitator/mentor

Name: Hung, Diana
Worked for more than 160 Hours: No
Contribution to Project:
Hung is a Mt. San Antonio College student serving as a peer facilitator/mentor

Name: Pantoja, Eric
Worked for more than 160 Hours: No
Contribution to Project:
Pantoja is a Mt. San Antonio College student serving as a peer facilitator/mentor

Name: Nguyen, James
Worked for more than 160 Hours: No
Contribution to Project:
Nguyen is a Mt. San Antonio College student serving as a peer facilitator/mentor

Name: Trevino, Joseph
Worked for more than 160 Hours: No
Contribution to Project:
Trevino is a Mt. San Antonio College student serving as a peer facilitator/mentor

Research Experience for Undergraduates

Organizational Partners

Other Collaborators or Contacts

Activities and Findings

Research and Education Activities: (See PDF version submitted by PI at the end of the report)
TEST:UP is a collaborative program, initiated in fall 2008, among three Hispanic Serving Institutions?California State University, Fullerton (CSUF), a four-year, comprehensive university, and Mt. San Antonio College (Mt. SAC) and Santa Ana College (SAC), two of CSUF's feeder two-year community colleges. All three campuses are located within 23 miles of each other and have diverse student bodies with enrollments exceeding 27,000 students.

Through TEST:UP, our collaborative program seeks to: 1) increase the recruitment and retention of STEM majors at Mt.SAC and SAC; 2) produce more STEM associate degrees and STEM transfers to four-year schools; 3) improve the retention and persistence of transfers and entering freshmen majoring in STEM fields at CSUF; 4) increase the number of students obtaining baccalaureate degrees in STEM disciplines at CSUF and other four-year institutions; and 5) improve mentoring and teaching skills of CSUF graduate students seeking community college teaching careers.

TEST:UP programs are impacting thousands of students by: significantly improving STEM learning environments; improving STEM academic advisement at our partnering two year colleges; and facilitating the transfer of two-year STEM students from Mt. SAC, SAC and other community colleges to CSUF or other four-year institutions in the face of drastic budget cuts and impaction. Our ultimate vision is that TEST:UP will result in a collaborative and replicable model of cooperation between two- and four-year institutions that results in the production of more STEM students and graduates.

Like other projects in the National Science Foundation's STEP program, TEST:UP has two overarching goals: 1) To increase the number of STEM transfer students to four-year universities and colleges and, 2) To increase the number of AA degrees and baccalaureates earned in STEM majors. More specifically, in our program we aim to increase by ca. 5% annually the number of new STEM majors at our partner community colleges (20 to 40 students per college for a total of 40 to 80 students annually) and to increase by 25 annually (50 at the two institutions) the number of students at those colleges who complete their associate degrees (or requirements) or who transfer to four-year

institutions (including but not limited to CSUF) in any STEM major. At CSUF, we projected that TEST-UP will increase by 40 students annually the number of transfer students who eventually earn STEM baccalaureate degrees.

We are meeting our goals on increasing declared STEM transfers from and STEM AA degrees awarded at the community colleges. (SAC underwent a major student information system conversion in 2009 that involved all aspects of college data processing. Information retrieval became increasingly difficult as we moved further into 2009-2010. The data comparing 2009-2010 to the previous year is therefore not likely to be accurate. However, subsequent data indicate that we are on track for production of STEM AA degrees and four year institution transfers).

It is too soon to assess impact of TEST:UP on STEM transfer graduation rates at CSUF as only ~20% of STEM students historically graduate within 3 years of transfer to CSUF and only 40-50% graduate within four years of transfer to CSUF and this report is due before fourth year transfers would have the opportunity to graduate.

We are close to meeting goals on CSUF graduate student instructors at the community colleges filling three of the targeted four positions.

Retention rates for STEM freshmen and transfer students at CSUF have leveled off at about 70% for both groups and reflect the impact of all retention efforts. These are intermediate indicators.

We have observed much improved passing rates and GPA with Supplemental Instruction (SI) at all three institutions, and significant steps have been taken to institutionalize the programs. The grant supports SI at the community college campuses and SI was supported by this grant at the CSUF campus in year 3 with re-purposed funds. SI has been shown to significantly close the achievement gap for underrepresented minorities (URM's) in key STEM gateway courses. The impact for Latina women and STEM transfer students was especially large. Self-selection of participants does not appear to be a significant factor based on high school grades and cognitive reasoning factors. In year 4, the College of Natural Sciences and Mathematics (CNSM) committed to supporting 54 sections of SI in both CNSM and the College of Engineering and Computer Science (CECS) as a step towards institutionalizing the program at the CSUF campus and rooms were reconstructed for dedicated SI use in CNSM. The community college partners are using a mix of grant and baseline support for expansion of their SI programs.

The number of community college STEM transfers to four year institutions can be hard to measure. We have not found information from the National Clearinghouse to be reliable. We depend on student exit interviews and transcript requests to get an estimate of this critical variable. Joint discussions with our campuses and NSF acknowledged this dilemma. We certainly do know if they come to CSUF and these numbers have been disappointing. We believe that this shortcoming is due to California's budget crisis-driven enrollment reductions, impaction (especially at Mt.SAC which is outside of our service area), and large tuition increases as State support has eroded significantly (students are staying at community colleges longer for financial reasons or cannot afford to attend a State university at all).

These results are summarized in Attachment 1. Strategy/Activity.

The section on findings also will review the results of efforts to: improve STEM transfer student advising at both the 2 and 4 year institutions; survey STEM transfer students pre- and post-transfer; analyze transcripts of STEM transfer students over the past five years; and pilot testing of an early warning system.

Findings:

To accomplish the goals of TEST-UP, we have four strategies. These are to: 1) improve counseling, guidance, and mentoring opportunities and improve information and knowledge of STEM careers for Mt. SAC and SAC STEM and potential STEM students, 2) develop support networks, including facilities and programs to develop learning communities, and facilitate the transfer of STEM students to CSUF and other four year institutions, 3) improve student learning (and therefore student success) in pivotal math and science introductory discipline courses by instituting supplemental instruction (SI) programs, and 4) develop a teaching intern/mentoring program to improve the pedagogical and mentoring skills of CSUF graduate students interested seeking two-year college teaching careers.

$149,295 in funds allocated to Mt.SAC were not spent in years 1 and 2. After consultation with the Program Director, these funds were re-allocated in year 3 to SAC and CSUF to support programs associated with the grant. SAC used re-purposed funds to further support their supplemental instruction (SI) program by adding 15 more SI sections to assist students in mathematics and biology courses. In addition, SAC augmented their presentation and instructional resources supporting STEM courses. In year 3 CSUF used re-purposed funds support 39 SI sections in math, biology, computer science and chemistry. As noted earlier, in year 4, fall 2011 and spring 2012, CNSM is funding 54 sections of SI in CSNM and CECS on the CSUF campus, and the community colleges continue to expand their SI programs. In addition, TEST:UP repurposed funds were being used to support a one-year year appointment for a STEM Student Success Coordinator who evaluated five years of historical transcripts of STEM transfer students to assess transfer-student preparedness for a four-year STEM degree program; administered

and analyzed pre- and post-transfer surveys for STEM transfer students developed specifically for this program; piloted an on-line early warning system; and ran a STEM student retention campaign on the CSUF campus. The transcript and survey activities provide increased capacity to evaluate the success of our advisement program and point out needs for change.

To provide advice and to guide TEST:UP, we have internal and external advisory committees that meet twice annually. We have an expert external evaluator, Dr. Shannon Gilmartin of SKG Analysis, who reviews our progress and points out needs to meet the goals of the program semiannually. We have also contracted with the Center for Research on Educational Acess and Leadership on the CSUF campus to more robustly evaluate data from the transcript and survey projects.

As an example of establishment of best practices, the core elements of the NSF TEST:UP program were adopted to submit for and receive a $6 million Department of Education HSI-(STEM)2 grant where CSUF is collaborating with three additional HSI community college partners (Cypress, Citrus, and Santiago Canyon Colleges) to build on improvements in STEM transfer success. Therefore, CSUF is now partnering with five local community colleges to facilitate STEM awareness and success for transfer students.

Strategy 1) Improve counseling, guidance, and mentoring opportunities and improve information and knowledge of STEM careers for Mt. SAC and SAC STEM and potential STEM students.

a. Advising Personnel

We hired one full-time Coordinator for STEM Transfer Student Services at CSUF and two half-time STEM Counselors and Advisors at Mt.SAC and SAC in 2008. Suitable space was made available for these personnel on all three campuses and STEM advising and counseling activities are on-going. Gina Garcia, CSUF's full-time Coordinator for STEM Transfer Student Services resigned in summer 2009 to enroll in a Ph.D. program at UCLA where she is performing dissertation work on topics related to our STEP grant. A successful search was completed to replace Gina with Cathy Fernandez-Weston who came to CSUF from Virginia Tech. Cathy took on this position in August 2009. As the CSUF Coordinator for STEM Transfer Student Services, Cathy continues to meet weekly and collaborate with Tammy Camacho at SAC and Oscar Flores at Mt.SAC who continued as the incumbent half-time STEM Advisors. The advisement activities of the two half-time STEM Advisors have been accepted by SAC and Mt.SAC counseling centers and are meeting with students regularly after significant initial barriers of acceptance that have been overcome with time and the support from the SAC and Mt. SAC Deans. This acceptance is a huge step in providing advisors for STEM in view of existing counseling practices at the community colleges and collective bargaining agreements that narrowly define responsibilities of the counselors. Once the counselors recognized that the STEM advisors were a resource for them, and not judgmental competition, this issue disappeared. It is sometimes advantageous to situate the STEM advisor in the counseling office with the title of 'Counselor/STEM Advisor'. Our program has thus improved STEM advisement on the two-year campuses and student access to STEM academic advisors. Drop-in STEM advisement is available and there has been an increase in student awareness of the need to get advice if a STEM degree is being sought. This is particularly important for STEM majors where hierarchical curricula are the rule and is very important for students with little knowledge of college programs, as is the case with first-generation college students and for many who belong to traditionally underrepresented minority groups. In addition, the STEM advisors are assisting students with the CSU and UC application process, which is highly important given the current constraints on transfer student admissions resulting from budget cuts.

b. Surveys and Transcript Analyses

Our pre- and post-transfer surveys provided more insight to the issues confronting the transfers from the student perspective. A pre-transfer survey was developed in fall 2010 and administered in December 2010 to 594 students in STEM classes at SAC and 529 at Mt. SAC. The survey was aimed at assessing the students' perceptions of preparedness for transfer to a four-year institution, and identifying key stumbling blocks, both real and perceived, in the STEM transfer process. We also administered a post-transfer survey to STEM transfer students currently enrolled at CSUF. We analyzed over 500 (about half)of the transcripts of STEM transfers to CNSM over the past five years to assess the level of preparedness of the students for a four year STEM curriculum. More rigorous work is underway to determine the robustness of the preliminary conclusions with the contracted service of the Center for Research on Educational Access and Leadership (CREAL) located on our campus. The services of an outside consultant were contracted to code the data for the surveys.

Some of the general pre-survey preliminary findings follow.
The top three resources that motivated STEM pursuit at both SAC and Mt.SAC include family, friends, and counselors. The perceived resources for success in STEM include access to instructors, working with other students on problems, access to STEM study centers. Less than half(38%-45%)of the students intended to major in STEM before they arrived at the community college, but most of the students (62%-72%) currently in STEM majors intend to complete all lower division STEM courses at the community college. They are overwhelmingly confident about their success in STEM and completing a four year degree. Approximately 35% of SAC students and 23% of Mt.SAC students are attending more than one community college. Most (~95%) students at both campuses do not intend to stop at an AA degree, ~20% intend to

achieve a bachelor's degree, ~25% intend to achieve a master's level degree, and ~25% intend to go for a doctoral level degree. Over 90% intend to transfer to a four year institution, 46% in STEM at SAC and 72% in STEM at Mt.SAC. About 55% at SAC and 44% at Mt. SAC reported that English is not their first language. 43% at SAC and 30% at Mt.SAC reported that they would be the first in their families to attend a four year university. Over 45% at both campuses are employed while attending college. About 12% at both campuses are foreign nationals. On both campuses: fewer women than men intend to transfer in STEM;those who intend to apply to a UC and not a Cal State are more likely to transfer in STEM; Asians have a much higher likelihood than Latinos for transferring in STEM; those who are most confident have a higher likelihood for transferring in STEM; and those who attend SI have a higher chance of transferring in STEM.

At SAC, the ethnicity and gender of the surveyed pre-transfer students were very similar to the general campus population with about ~53% Latinos, ~20% Asians and ~10% Caucasians, and ~38% male, ~62% female.

At Mt.SAC the ethnicity and gender of the survey population was not representative of the general population and more like what one might expect from a typical STEM population based on the literature, with ~25% Latinos, ~42% Asians, and ~9% Caucasians and ~57% male and ~43% female. We separated the self-proclaimed STEM majors to look more closely at that population, reducing the number of surveys is to 329. This was further reduced to 256 for students who did not supply answers to the intent to transfer to STEM question. As noted, we are continuing analyses with the contracted service of the Center for Research on Educational Access and Leadership (CREAL) located on our campus to refine the analyses.

The post-transfer survey (N=247) of responding students from CNSM and CECS at CSUF yielded preliminary findings which include: 62% are first generation college students; 73% are single; 16% are living with a partner or are married; 65% elected to go to a community college even though they were eligible to attend a four year campus; 66% had been in community college for three or more years; 51% did not intend to transfer in STEM when enrolling in the community college with 41% deciding in the 3rd year, 32% deciding in the 2nd year, and 28% in the first year; counselors were mostly informative on general requirements to transfer and STEM major prerequisites but only about one third were informative about undergraduate research opportunities, 58% spoke about getting an AA degree, 22% encouraged them to be a STEM major, and 20% were helpful in exploring careers in STEM. 63% of the responding students felt confident that they would complete their four year STEM degree requirements and graduate. About one third of the students were either still attending a STEM course at the community college or intended to do so after transferring due to cost, convenience, familiarity, and course availability. 66% of the transfer students had not yet engaged in undergraduate research, 54% planned to engage, but only 34% knew where to find the research engagement opportunities. In advisement with CSUF faculty members (mandatory every semester in order to register), only 37% reported having discussed graduate or professional school, 50% had discussed career plans, only 41% had discussed undergraduate research, and only 30% had discussed letters of recommendation.

The 532 transcript analyses of CSUF CNSM students from 2005-2010 gave the following preliminary results: roughly half were male, half female; 35% were Asian, 15% Latino, 32% international students; biology majors have increased over tenfold while other science and math majors did not increase; over half the students had taken courses at more than one community college; and the average GPA upon transfer was 2.95 and averaged 2.72 in the first semester after transfer. 69 students (13%) in this group had graduated in STEM fields; 293 (55%) were still in STEM majors; 140 (26%) were no longer STEM majors; 12 (2%) were disqualified; and 18 (3%) were no longer enrolled. 36% had never received less than a C grade in a STEM course while the rest had not achieved at least a C grade in one or more STEM courses. A large number in each STEM major did not arrive at CSUF with the appropriate level of math or science. Students who engaged in undergraduate research had a much higher of level of persisting in the STEM major. Analyses continue with the Center for Research on Educational Access and Leadership (CREAL).

c. Early Warning System

An on-line early warning system was developed in 2010 to identify at-risk students in CNSM and CECS within their first semester at CSUF. The system requests that faculty respond to four simple questions for all new CSUF STEM students (transfers and first time freshmen) within the first 3 to 4 weeks of the semester on indicators such as attendance, quizzes and homework assignments. Transfer students identified as being at-risk are individually contacted and invited/encouraged to see the CSUF Coordinator for STEM Transfer Student Services to make plans to improve their time management and performance in class. First time freshmen are asked to see the CNSM Associate Dean to make plans to improve their time management and performance in class. The data clearly indicate that transfer students are less likely to take advantage of intrusive interventions as compared with first time freshmen. They are not accustomed to unsolicited assistance and think that they already know how to succeed in the four year university based on their community college experience. On the other hand, when the transfer students show up for the intervention, they are considerably more successful as students.78 transfer students were flagged for interventions and 25 showed up to meet with the STEM Transfer Student Coordinator. Of the 25 who came in for the intervention in fall 2011, 72% maintained good academic standing and 28% were put on probation in spring 2012. Of the 53 who did not come in, 51% maintained good academic standing in fall 2011 and 49% were on academic probation in spring 2012. First time freshmen showed up in much greater numbers (81 out of 116 contacted) but the interventions, and while all were appreciative of the interventions, they had disappointing impact. 52% of the 81

couseled in fall 2011 were in good academic standing in spring 2012, while 48% were on probation. For that reason, we decided to abandon the early warning for freshmen and to continue the program with the transfer students.

Another impediment to a successful early warning system is reliance on faculty to respond in a timely manner. Ideally, an early warning system will bypass faculty and use grades in the Learning Management System to trigger the warnings to students. Such a system has been developed by the University of Arizona, and the HSI-STEM2 grant to CSUF from the Department of Education will attempt to explore that route. Then again, not all faculty members use the Learning Management System.

Strategy 2) Develop support networks, including facilities and programs to develop learning communities, and facilitate the transfer of STEM students to CSUF.

a. 25-35 Campaign

A study campaign similar to the 25-35 empowerment campaign at CSUF (encourage students to study 25-35 hours per week outside of class time) has been implemented at SAC with the goal of increasing student study time in STEM courses. The 25-35 campaign runs continuously at CSUF.

b. Family Engagement

Students and their families often do not recognize that when compared to high school, much more time is needed outside of the classroom to succeed in college. This is particularly true for first generation college students. The C NSM has also implemented and funds an NSM Day that takes place before the start of the fall semester at CSUF for both transfer students and first time freshmen. This is an outreach program that augments orientation activities by bringing in new students and their families to learn more about time management and requirements for success in STEM fields at no cost to participants. These bilingual NSM days typically attract ~150 participants.

c. Mandatory Advising

CNSM has also instituted mandatory on-campus academic advisement for newly arriving transfer students beginning June, 2011. Registration is put on hold until they receive in-person advisement by faculty at CSUF. This helps ensure that students are taking the right paths for initial placement in appropriate mathematics and science courses and shorten time to graduation. The faculty are paid from CNSM funds indicating more institutional support.

d. Faculty Mentoring

At SAC, infrastructure for the faculty mentoring program was developed and the linking of SAC faculty and students is a key in recruiting new two-year college students to these difficult and complex majors. Through these linkages students were referred to resources which efficiently exposed them to academic programs and career options (e.g., through STEM panels and student/faculty socials).

e. Reward System/Book Scholarships

A book voucher reward system was put into place at all three campuses to encourage STEM major participation in our programs. The book voucher system provided incentive to students to participate in activities which would be advantageous to their academic progression but would cost them valuable time. The program requires participation in 5 or more STEM outreach activities based on campus over the course of an academic year to qualify for the voucher. These activities include events, peer mentoring or counseling meetings, resume preparation, and club participation.

Strategy 3) Improve student learning (and therefore student success) in pivotal math and science introductory discipline courses by instituting supplemental instruction (SI) programs.

We implemented SI programs adopted after the University of Missouri-Kansas City model at CSUF and SAC. Mt.SAC had already implemented SI using this model prior to the grant and uses TEST:UP funds to expand SI workshops. Results to date are summarized in Attachment 1. Rigorous evaluation exists for the impact of SI on Math 150A (Calculus I) and Biology 171 (Biodiversity and Evolution) at CSUF over a five year period. Consistent grade point average improvements and passing rate improvements are observed in key gateway STEM courses. The impact for courses indicate no self-selection effects based on high school grades and cognitive reasoning skills and are statistically significant at a high level of confidence. For underrepresented minorities (URM's) the results are especially important and help to close the achievement gap. At CSUF, a goal was to improve SI strategies and to expand conversations with community college partners to

develop a regional SI network. In spring 2009 10 SI workshop sections were offered including an introductory level biology lab course, pre-Calculus,Calculus I, and Calculus II. In fall 2009, SI workshop sections rose to 17 with additional courses added including Organic Chemistry I and College Algebra. In spring 2010, SI workshops increased to 20 sections and included Organic Chemistry II, and Physical Chemistry II. In fall 2010, SI workshops increased to 35 with additional courses now including Cellular Basis of Life, and three gateway computer science courses in ECS: Introduction to Programming; Programming Concepts; and Data Structure Concepts. In spring 2011, CSUF fielded 39 SI sections, all entirely funded by this grant with re-purposed funds. In fall 2011 and spring 2012 CNSM is funding 54 sections of SI, expanding to more advanced calculus courses, second semester general chemistry courses, and to elementary physics courses. Through the end of the spring 2012 semester, we expect that approximately 3500 students will have been involved in 5 or more sessions of the SI workshops at CSUF. As further evidence of institutional support, dedicated SI facilities were built for mathematics and biology and one will be built for chemistry in the coming months. These SI workshops have been very successful. In introductory gateway biology courses at CSUF the average improvement in GPA (students attending SI sessions regularly versus those who did not participate in SI) is 0.72-0.79 and passing rates improved from 57% to 83%. In CSUF mathematics, the improvement in GPA is 0.50-0.75, and the passing rate for SI participants was 74%-82% versus 49%-69% for non-participants last year. Similar results are being obtained at the partner community colleges.These results are summarized in Attachment 1. Strategy/Activity Chart.

Each of the SI sessions is led by a student who has strong content and communication skills. The SI leaders in all of the disciplines also attend a day-long training session led by professors from the disciplines, most of whom have attended the University of Missouri Kansas City SI training program. In CSUF biology, chemistry, and physics, students in targeted SI courses have the option to attend SI sessions that are offered twice each week. In CSUF mathematics, students sign up for the SI as a separate 1 unit course (credit/no credit) and are required to attend. In computer science students had the opportunity to participate during laboratory recitations. The community colleges have adopted both the voluntary attendance and course credit models. In all the disciplines, SI leaders attend the professor's lecture each day to ensure that their SI sessions are current, and to act as a role model for students in the course. SI leaders then meet with students at least 3 hours per week to creatively work on problems based on that week's lessons, using tools like the 'Jeopardy' game to engage students. Each SI leader receives ~ $1,500 per semester as compensation for their time.

At SAC, SI groups were created in spring 2009 supporting 2 sections of an introductory microbiology course. In fall 2009, SI was expanded to 4 biology sections; in spring 2010 SI was expanded to 8 biology sections, and in fall 2010, SI was offered in 8 biology and 2 mathematics sections. In spring 2011 SAC continued to expand SI offerings, but complete analyses are not yet available. Due to SAC's rapid immersion in the TEST:UP program, additional re-purposed funds were provided to support SI activities in year 3.Dr. Kathy Takahashi of SAC has oriented her peer tutors at the CSUF training sessions and is assessing their effectiveness. Results to date indicate improved retention in classes and higher grades. Average retention rates with SI at SAC increased from 71%-79% to 92% in biology courses and from 70%-80% to 85%-96% in math courses. Grades (%) improved from 69% to 79%-83% in biology courses and from 78% to 83%-91% in math courses.

Mt.SAC continues to offer SI in courses established prior to TEST:UP and Eva Figueroa is the SI coordinator on campus. Mt.SAC expanded its SI programs using TEST:UP resources starting in fall 2010 in math, biology and physics. Mt.SAC experience also indicates similar and consistent improvements in passing rates and GPA with students attending at least 5 SI sessions in math and science.Average passing rates with SI at Mt.SAC increased from 79% to 88% in the sciences and from 79% to 86% in math courses.GPA improved from 2.40 to 2.66 in science courses and from 2.41 to 2.58 in math courses. Mt.SAC results from 2010-2011 are under analysis.

While recruiting SI leaders takes some directed effort, our experience is that there are a number of undergraduate students who are excited about this opportunity. An exit survey was given to the SI leaders at the end of the semester in year 2. The purpose of this survey was to give SI leaders the opportunity to anonymously express their experience in the program as well as to share their observations and recommendations for future SI. The survey asked SI leaders, based on a 5-point Likert scale, to give their level of agreement or disagreement with fifteen different statements pertaining to SI. The survey centered on five important ideas or constructs:

a.Level of preparedness of students in the course
b.Level of effectiveness of SI on increasing student achievement
c.Level of satisfaction with the experience of being an SI leader
d.Impact on academic self-perception for SI leaders
e.Impact on career self-perception for SI leaders

Each construct was explored with at least two questions using opposite scales so as to minimize answering bias. Of the 26 SI leaders, including 22 and CSUF and 4 at SAC, 20 (77 %) submitted completed surveys. Results showed that SI leaders felt that the experience was positive to very positive for them both academically and professionally. Eighteen of the twenty students indicated that the SI gave them 'valuable classroom teaching experience,' while 17 of the SI leaders indicated that the experience has made them become more interested in either 'considering teaching as a career' or 'going to graduate school.' There was some disagreement on level of satisfaction with the pay

($1,500 per semester, or about $10 per hr), with mean score of 4 but a standard deviation of 1.08. SI leaders generally agreed that students in the SI lacked basic skills for success in the course. Indeed, SI leaders regularly 'built in' practice for these skills on their bi-weekly worksheets to help SI students strengthen these skills in the context of problems in their mathematics, biology, or chemistry course. Overall, the exit survey showed evidence that the experience was valued by the SI leaders and helped give them the opportunity to view themselves as future professionals that they might otherwise not have had as undergraduates.

Based on the initial results of impact of both SI participants and SI leaders, we envision several articles and numeropus presentations targeting audiences in education, mathematics education, and science education. These efforts went into high gear in year 4 and are summarized in the section on publications.

This year, we are conducting interviews with the SI leaders as a project for our Center for Advancement of Research on Teaching and Learning Mathematics and Science (CATALYST) to update our understanding of the impact on them, and to broaden the data base.

The principal challenge at CSUF has been securing stable institutional funding for the SI peer facilitators and faculty involved in offering the SI courses. Program funding has been obtained on a semester by semester basis, largely through external and internal grant support.This was not envisioned as a challenge at CSUF at the time our proposal was submitted so funds were requested for faculty to organize and administratively develop and support the program and create faculty involvement and buy-in. However, the reduction in State funding to CSUF has compromised our ability to operate this program with the needed predictability. Yet,enrollment in the program is expanding and the campus culture is changing as students are telling one another about the benefits of the SI workshops and successful results (improvements in GPA and pass rates) are being achieved. At CSUF, SI is fully supported by CNSM in year 4.

The community college partners recognize the value of SI which is already institutionalized at Mt.SAC. SAC is very enthusiastic about SI and is planning to make it required in the key math and science courses, as they have some flexibility in hours per course without changing the units.

With the economic problems in California, the sustainability of the successful programs of TEST:UP, such as SI, will need to be defined in monetary terms. Quite simply,improved graduation rates will save money at the CSU State level and the CSU system has an initiative to increase graduation rates. The programs we are evaluating in TEST:UP are expected to point the way towards higher graduation rates among our STEM transfer students. TEST:UP programs are consistent with and are informing CSU system wide and CSUF campus efforts to increase the graduation rates of all CSU students. So, we are optimistic that funding stability will be obtained in particular since CSUF is focusing efforts on moving students more rapidly to graduation and that our SI program is targeting courses that historically have had high repeat rates that slow progress towards graduation. The CNSM and CECS have now both funded the cost of mandatory face-to-face transfer student advisement to help increase graduation rates.

Strategy 4)Develop a teaching intern/mentoring program to improve the pedagogical and mentoring skills of CSUF graduate students interested in seeking two-year college teaching careers.

CSUF has a significant number of graduate students who seek to obtain a teaching position at a two-year college. These students are trained at CSUF through formal coursework, mentored on best practices for engaging students and implementing active learning strategies, and have teaching experience as assistants in labs and discussion sections. We proposed to establish a teaching internship program at our community college partner institutions to provide CSUF graduate and Master of Science students with an attractive transition toward a professional career. In addition, our plan was to further connect STEM students at the two-year institutions with CSUF through these teaching interns.

To implement this strategy, CSUF teaching interns were to be placed in positions at the two-year colleges where they were to function as adjunct or part-time faculty instructors. Each teaching intern was to be hired using two-year college (not NSF) funds and assigned a community college faculty mentor. In addition to their teaching commitment, each intern was to receive a stipend from NSF TEST:UP funds to carry out advisement and mentoring duties at the two-year college site. This program was first planned to be implemented in fall 2009. However, with the budget crisis in California, we were concerned that implementation of this program would come at the expense of displacing existing, long-standing part-time instructors. Therefore, start of this program was delayed until fall 2010 with a single section of mathematics at SAC. A second planned mathematics section taught by a CSUF graduate student was aborted due to family illness. We had no biology graduate students available from CSUF in fall 2010 as they were all engaged in CSUF lab teaching activities.

Two CSUF mathematics graduate students taught at SAC and one CSUF biochemistry graduate students taught at Mt.SAC in spring 2011. The same three students are teaching at these institutions in 2011-2012.

Training and Development:

TEST:UP is engaging faculty from CSUF, SAC and Mt. SAC in new and more focused efforts to attract and retain more STEM students. TEST:UP is providing the impetus for the three campuses to work together to institute or increase the number of SI sections and other programs to improve student learning and performance in key gateway math and science courses.

TEST:UP participating faculty at CSUF and SAC and the CSUF Coordinators for STEM Transfer Student Services attended workshops held at the University of Missouri-Kansas City to learn about the UMKC SI model. Instructional strategies are being modified and new approaches being taken on the CSUF and SAC campuses. Participating TEST:UP faculty are learning about effective strategies to increase student learning and performance in entry level math and science courses, and are sharing this knowledge with one another. Conversations between some CSUF, Mt. SAC, and SAC faculty have developed as part of this collaborative SI effort.

CSUF PIs Mark Filowitz, Rochelle Woods, Marty Bonsangue (Math), and CSUF faculty members Sean Walker (Biology), Nicole Engelke and Todd Cadwalladerosker (Math), and others, are actively involved in CNSM retention efforts and regularly attend meetings related to TEST:UP goals. The full-time CSUF Coordinator of STEM Transfer Student Services and the two half-time STEM advisers are honing skills in advising and counseling and learning about STEM careers. The Coordinator, Cathy Fernandez-Weston, also is strengthening and applying her skills in student services to form student communities and to make students aware of the coursework and achievement needed for transferring to four-year institutions in STEM fields. She is pursuing a second Master's degree in Counseling at CSU Long Beach and is now in her second year of the program. Ricardo Lopez, our STEM Student Success Coordinator hired from re-purposed funds in year 3, is now a counselor in the CSUF Academic Advising Center.

The CSUF Coordinator for STEM Transfer Student Services has attended SI Supervisor Training, at Kansas City, Kansas, the NSF-STEP Two Year/Four Year Partnership Workshop, at Belknap, Oregon, the National Institute for the Study of Transfer Students conference in Addison, Texas, and the NSF STEP Project Directors Meeting in Arlington, Virginia. She attends the NSF STEP Grantees Meeting in Washington, DC, but will miss the 2012 session due to maternity leave.

The number of CSUF undergraduate and graduate student SI leaders is growing and these students are being educated in methods of engaging students and stimulating them to advance their learning by working cooperatively to solve problems. Several of these students have gained interest in teaching and are now considering teaching careers in math and science, an unplanned outcome of our STEP project. New CSUF undergraduate peer mentors have joined our project and these students are appreciating the importance of learning communities and are being educated in how to engage students, organize activities, and develop functioning learning groups.

Similarly faculty and students working in the SI program at SAC are developing skills in improving instruction and education in STEM courses. At SAC, an additional advantage of TEST:UP is that NSF funds have provided opportunity and the resources for faculty to meet and make contact with STEM faculty from other colleges and universities. Dr.Cher Carrera (Department Chair, Mathematics) has attended the NSF-STEP Two-Year/Four Year Partnership Workshop at Belknap, Oregon. This workshop laid the foundation for her further involvement in this program. In spring 2010, Cher Carrera and Carol Comeau (Dean of Science, Math and Health Sciences) attended the NSF STEP Program Directors meeting in Arlington, Virginia, and in 2011 the NSF STEP Grantees meeting in Washington, D.C. and she will attend in 2012. From Mt. SAC, Dr. Larry Redinger, Dean of Natural Sciences and Mathematics, and Dr. Iraj Nejad, professor of chemistry, attended the NSF STEP Grantees meeting in Washington, D.C. in 2011 and will attend the grantees meeting in 2012. Eva Figuroa, SI Coordinator at Mt. SAC, and Kathy Takahashi, biology professor at SAC, attended the January, 2011 SI workshop at California State University, Fullerton (CSUF) with SI student leaders.

Outreach Activities:

We have made other community colleges aware of TEST:UP and its programs and goals. Our original vision was to use TEST:UP as a vehicle to form closer bonds between CSUF and neighboring community colleges in order to facilitate the transfer of STEM students. TEST:UP has served as the foundation for expanding CSUF STEM relationships with two other community colleges: Citrus College and Cypress College. We completed subcontracts with Citrus for increasing STEM advisement and with Citrus and Cypress for providing summer research experiences on the CSUF campus for two-year STEM students. Our agreement with Citrus College enabled us to hire a second full-time Coordinator for STEM Transfer Student Services who developed similar STEM advisement programs at Citrus College. Citrus College reported a 7-fold increase in STEM majors in the contract period. This same person, Ricardo Lopez, was hired for the TEST:UP program with re-purposed funds in year 3, upon conclusion of the Citrus program.

At CSUF, we continue to expand outreach activities to increase awareness of the value of a STEM education and career opportunities in STEM fields, particularly with underrepresented populations. As an example of establishment of expanding best practices to the community, the core elements of the NSF TEST:UP program were adopted to submit for and receive a $6 million Department of Education HSI-(STEM)2 grant where CSUF is collaborating with three additional HSI community college partners (Cypress, Citrus, and Santiago Canyon Colleges) to build on improvements in STEM transfer success. Therefore, CSUF is now partnering with five local community colleges to facilitate STEM awareness and success for transfer students.

At SAC a total of 42 outreach and social events were sponsored since grant inception, including visits to CSUF and NASA laboratories, STEM Week activities, research weekends, conferences (such as SACNAS) and workshops on STEM opportunities and application processes to enroll in four-year universities. At Mt. SAC only 10 outreach and social events were sponsored by the grant since inception, as the program got off to a slow start on that campus in the first two years. We have seen accelerated activities at Mt. SAC going forward as they inaugurated a new natural history and exploration center in a prime campus location in spring 2011, and chemistry Professor Iraj Nejad became actively participating in the grant with Dean Larry Redinger.

The STEM advisers have developed educational and curricular roadmaps for STEM transfers. Informative STEM web sites at the three campuses are all now active and up to date. Good progress was made to more fully integrate STEM advisers with regular academic services on all three campuses, and to more actively involve STEM faculty in TEST:UP. Classroom visits in STEM subjects are increasing on both community college campuses with the permission of the Deans, department chairs and instructors, who generously allow class time to promote STEM awareness, career opportunities, surveys, and events. STEM Weeks on the community college campuses and invited speakers from four-year institutions both provide forums to educate students on STEM career opportunities. One critical component of this has been to teach students how to apply to the CSU and the UC as a transfer student. We are leveraging our NSF STEP grant with other external funding by involving a number of SAC and Mt. SAC STEM majors in weekend and summer research experiences at CSUF supported by programs like the Howard Hughes Medical Institute (HHMI) biomedical research program, thus integrating the impact of the research experiences with the goals of TEST:UP. In 2011 we also initiated a research immersion at CSUF during the regular semester for 5 new STEM transfers, with good anecdotal success despite the brevity of the program.

At SAC,the TEST:UP counselor is working with SAC Early Decision students to provide STEM advisement. These are students from local feeder high schools in the Santa Ana Unified School District that are placed into their first college courses. Preliminary math placement tests indicate that over 1,000 students per year went through this process since 2010. Handouts were developed for these students identifying STEM counseling contacts and student contact information collected so that counseling staff can follow-up when they arrive on campus.

TEST:UP has advised 397 students on the SAC campus since 2008. TEST:UP had advised 207 students on the Mt. SAC campus through year 3 of the grant but they have not yet supplied information for year 4. Mt.SAC and SAC advisors have recruited participants in the TEST: UP program on their respective campus through class visits, information tables, career day fairs and STEM Week events.

In 2011 SAC reported the following events (number of students participating in parentheses).
Spring: STEM Campus/Lab Tour Visit to CSUF(14); STEM Outreach Class Visits/Presentations (231); Field Trip to NASA Jet propulsion Lab Open House (34); State of the Planet's Oceans Video Screening (150); How to be a Successful Math Student Workshop (38); How to Be A Successful Biology Student Workshop (16); TEST:UP presentation to new SAC students (225).
Fall: CSU Application Workshop (18); STEM Week: Land Of Plenty, Land Of Want (57); STEM Week: STEM Resume Workshop (16); STEM Week; STEM Career Panel (32); STEM Week: Planetarium Presentation (11); STEM Week: STEM Student Panel (5); STEM Week: How To Study For Math Workshop (10); STEM Week: How To Study For Biology Workshop (29).

In 2011, Mt. SAC reported the following engagement activities:
16,900+ Hours - Students hours at Earth Science, Biology and Mathematics Student Resource Centers (1,700-Earth Sciences; 3,800-Biology; 11,400 Math); 550+ Students - STEM students involved in Mt. SAC Exploration Center and Meek Natural History Center; new Summer Sciences Camp for 9-12 grade students, 3-week program using 10-14 STEM students as teaching assistant interns. TEST:UP participated by tabling in fall and spring College Fairs, the New Student Spotlight, the Welcome Days, and Student Orientation leading to increased and more frequent visits to the Natural Science Resource Center where the students receive one on one academic advising and individual educational planning advice by the STEM Counselor. To stimulate more interest in STEM, a movie from the PBS Planet Earth series, Hot Zones, was shown in fall attracting 54 students. With assistance from the Mt. SAC Office of Advising and the Transfer Center, four application workshops were conducted in fall 2010, of which three were focused on the transfer process to the CSU, the UC, and private universities, and one focused on writing a personal statement. Each workshop had 40-45 students in attendance. In spring 2011, enrichment activities included guest speakers from California State University Fullerton, University of California Irvine, and Cal Poly Pomona, highlighting opportunities and programs available to support transfers in research activity at their campuses. The Mt.SAC Natural Resource Science Center arranged visits to campuses and laboratories in the southern California area including California Insitute of Technology (Cal Tech), UCLA, and CSUF, each with 12-15 students participating. Christine Shea, Assistant Director of Undergraduate Admission at USC School of Engineering visited with 12 potential

engineering recruits at Mt.SAC. Field trips brought 15 students to the South Coast Air Quality Management District (AQMD) in Pomona to observe scientists and engineers at work related to the environment, and 25 students went to the Jet Propulsion Lab (JPL) in Pasadena where they participated in interactive experiences.

The CSUF Coordinator for STEM Transfer Student Services and her STEM Peer Advisors have advised 530 of the 1586 STEM transfer students since the program started in 2008, roughly 33%. In addition, they held the following events (number of participants in parentheses):

Spring: STSS Welcome Social (18); NSM/ECS Club Day (11); Movie Night (7); Interviewing 101 (8); Arboretum Nature Tour (4); CSUF Baseball Game (5); Undergraduate Research Seminar (9); Game Night (16); Study Abroad Workshop (4); FSAE Formula Racer Unveiling (8); Graduate Panel (9); Study Retreat (11).
Fall: Welcome Social (9); Ice Cream Social (9); Resume/ Cover Letter (4); Titan Game Night (2); Bowling Night (13); Job Hunt (5); Research and Internship (14); Food Drive (6); Center for Internships and Community Exchange (CICE) workshop (3); Board Game Night (5); Health Center (5).

The CSUF Coordinator for STEM Transfer Student Services continued to meet with science and mathematics department chairs and faculty and gained access to introduce TEST:UP in classroom visits and to administer the pre-transfer surveys described earlier. The sciences at Mt.SAC recently relocated into a new building containing a study center that houses tutoring services and Supplemental Iinstruction activities. As noted earlier, a study campaign similar to the 25-35 empowerment campaign at CSUF (encourage students to study 25-35 hours per week outside of class time) has been implemented at SAC with the goal of increasing student study time in STEM courses. Also as noted earlier, students and their families often do not recognize that compared to high school, much more time is needed outside of the classroom to succeed in college. This is particularly true for first generation college students. The College of NSM has also implemented and funds an NSM Day that takes place before the start of the first semester at CSUF for both transfer students and first time freshmen and their families. NSM day is conducted in English and Spanish.

Journal Publications

Books or Other One-time Publications

Web/Internet Site

URL(s):
http://nsm.fullerton.edu/testup/
Description:
This is a dedicated website for CSUF's TEST:UP program. The website contains links to websites for Santa Ana College and Mount San Antonio College(under development), Internal and external advisory committees for participating institutions, strategies and programs, reports and presentations. The website also provides contact information and will distribute publications and other program products.

Other Specific Products

Product Type:
Abstract of Poster Presentation
Product Description:
Abstract of Poster Presentation:
Hoese, W.J. & S.E. Walker. Getting the horse to drink: The effect of supplemental instruction on student performance in introductory biology at a large, urban, commuter university. American Association for the Advancement of Science: Transforming Undergraduate Education in Biology: Mobilizing the Community for Change. Washington, D.C.

Poster #5
Category: A1
Primary Project or Approach: Encouraging and Enabling Student Active Learning (Examples include

Case Studies, POGIL, Clickers, Problem Based Learning)
Institution: California State University Fullerton
Presenter: Bill Hoese
Email: bhoese@fullerton.edu
Co-Presenter: Sean Walker, California State University Fullerton
Field of Interest within Biology: General Biology
Goals & Intended Outcome: Our primary objective is to improve student performance in the introductory majors biology course (Evolution and Biodiversity) that serves 400 students annually. Secondly,because CSUF is primarily a commuter campus, we seek to provide an opportunity for students to build peer- networks and gain a sense of community.

Methods & Strategies: We implemented a modified model of supplemental instruction where advanced undergraduates lead voluntary discussion sections for students in Evolution and Biodiversity.

Evaluation Methods & Results: We monitored attendance at sessions and student performance in the course. Over five semesters approximately thirty percent of students took advantage of these sessions. The students who attended these sessions had higher exam scores and were more likely to pass than students who did not.
Dissemination Activities & Plans to Disseminate: We plan to disseminate via conferences and are writing a manuscript of our experiences.

Impacts of Project or Anticipated Impact: We experienced a positive impact on student performance with a manageable amount of faculty time investment. Our supplemental instruction leaders found that they enjoy teaching and learn more of the material as a result of their experiences.

Challenges: It has been difficult to offer supplemental instruction sessions during times that match well with student schedules. Faculty need to promote supplemental instruction sessions to the students, but once students begin attending sessions and they experience the benefits of supplemental instruction, they tend to continue attending throughout the semester. It has been challenging to identify supplemental instruction leaders.

Sharing Information:
via Project wwebsite

Product Type:

Workshop Presentation

Product Description:
Bonsangue, M., Carrera, C, and Renne, C. Supplemental Instruction Workshops in Gateway STEM Courses at Cal State Fullerton and Santa Ana College. Creating Pathways for STEM Transfer Student Success, Asheville, NC, Sept 20, 2010. As part of the NSF Project TEST-UP, the Colleges of Natural Science and Mathematics at California State University, Fullerton and Santa Ana College proposed to improve student success and encourage greater numbers of students to persist as STEM majors by concentrating on key entry level mathematics courses. Results showed that (1) students participating in SI had a passing rate of approximately 84 % v. 64 % for the non-SI group; (2) students participating in SI outscored non-SI group by more than half a grade point (2.59 v. 1.97); and (3) students participating in SI had a F/WU failure rate less than half that of non-SI group. While students self-selected into the SI, there was evidence of value-added from SI participation. First, there were no significant differences between SI and non-SI groups in SAT-M, SAT-V, or HSGPA, so that SI participants did not seem to have a pre-college academic advantage. Second, there were no significant differences between SI and non-SI groups in college GPA and course-repeating patterns, so that SI participants did not seem to have an in-college academic advantage. And third, in multiple-section courses such as Math 150A and Math 150B, the non-SI group achieved at or above the level of all other non-SI sections, suggesting that the achievement of SI students did not do come at the expense of the achievement of non-SI students. Exit survey data indicated that more students would have participated in SI had they known about the SI program when setting up their schedule, especially in calculus. This review found that there was both quantitative and qualitative evidence to support the expansion of the SI program at both CSUF and SAC. In addition, there was evidence that the experience was valued by the SI leaders and helped give them the opportunity to view themselves as future professionals that they might otherwise not have had as undergraduate students.

Sharing Information:
This product and other results will be shared in a regional conference and future publication on Supplemental Instruction.

Product Type:

Conference Presentation

Product Description:
"Elucidating Key Variables in the STEM Transfer Student Experience From the Integration of Multi-Institutional Research Projects", Ricardo

Lopez, Cathy Fernandez-Weston, Mark Filowitz, Rochelle Woods, Martin Bonsangue, Sean Walker
NISTS Conference on Creating Pathways for STEM Transfer Student Success, September 12, 2011, Asheville, NC

Sharing Information:

(1)In part one of this project, a 47-item, anonymous survey was disseminated at two community colleges (CC), each at distinct geosocialogical locations, to examine the following in students that intend and lack intent to transfer into four year level STEM programs; academic experiences in Math/Science courses at the CC level, use and perception of CC Networks of Support (e.g., frequency and influence of CC Counselor appointments), perceptions of four-year level STEM Courses and experiences, and future degree and transfer plans. A survey tool was created to examine the aforementioned since extensive literature review revealed very few studies focused on STEM transfer student experiences. For the survey tool internal consistency was calculated via Coefficient Alpha, instrument face validity was enhanced via pilot testing, and content validity was refined through student focus groups and consultations with Student Service Professionals, administrators and faculty at the two and four year levels and experts in the field in STEM transfer student experiences. This survey was taken by 1,123 current CC students.

(2)In part two of this project, a 45-item, anonymous on-line survey was disseminated at California State University Fullerton (CSUF) to identify factors that enabled successful transfer to CSUF, as well as assessing experiences that may be related to persistence and retention in four-year STEM majors. Extensive literature review also revealed few survey tools specifically aimed at learning more regarding STEM transfer experiences, thus another survey tool was created for this part of the project. Similar internal validity measures were established for this survey as described in part one. This survey was taken by 247 current STEM Transfer students attending CSUF.

(3)Part three of this project involved the assessment of transcripts from current STEM students who transferred to CSUF from 2005 to 2010. The aim is to examine pre-transfer enrollment patterns, types and level of STEM courses taken before and after transferring, academic enrollment and outcome patterns at CSUF, and an assessment of persistence and retention in STEM majors by cohort analysis. Extensive literature review revealed very few studies that have examined the aforementioned via analysis of four-year transcripts of STEM transfer students.

Product Type:

Conference Presentation

Product Description:

"STEM Transfer Student Services: Bridging the Transfer
Gap and Mitigating Transfer Shock", Cathy Fernandez-Weston, Ricardo Lopez, Mark Filowitz,Rochelle Woods, Martin Bonsangue, Sean Walker
NISTS Conference, Creating Pathways for STEM Transfer Student Success, September 13, 2011, Asheville, NC

Sharing Information:

The Coordinator for STEM Transfer Student Services is a California State University, Fullerton (CSUF) based position. The Coordinator travels to Santa Ana College and Mt. San Antonio College to collaborate with half-time community college STEM counselors and to recruit and advise potential STEM students. At CSUF the coordinator plans and organizes STEM transfer programs and activities that include: peer mentoring, early warning, social events, educational workshops, academic coaching, transfer orientation and a STEM transfer book scholarship.

Product Type:

Conference Presentation

Product Description:

"Talent Expansion in STEM a 2yr to 4 yr collaborative," Cathy Fernandez-Weston, Tammy Camacho, Carol Comeau, Mark Filowitz,Ricardo Lopez, Rochelle Woods, Martin Bonsangue, Sean Walker
STEMtech Conference, October 4, 2011, Indianapolis

Sharing Information:

TEST: UP is a 2yr to 4 yr collaborative that focuses on STEM Counseling, STEM peer advising, Supplemental Instruction, STEM Transfer demographics and transition concerns specific to STEM students

Product Type:

Conference Presentation

Product Description:

"Bridging the Gap: Facilitating Transfer Student Success Through Services and Programs," Rochelle Woods, Cathy Fernandez-Weston, Mark Filowitz
NASPA Western Regional Conference, November 19, 2012

Sharing Information:

The CSU Fullerton STEM Transfer Student Services Office bridges the gap of culture and expectations between the community college experience and the 4-year university experience. Community colleges are the fastest growing post secondary educational institutions and participants will learn about the role student affairs plays in creating services for transfer students to help them become academically successful at 4-year institutions.

Product Type:

Conference Presentation

Product Description:

"The Effect of Supplemental Instruction on Transfer Student Success in STEM Courses", Martin Bonsangue, Mark Filowitz, James Hershey, Hye Sun Moon, Edward Sullivan, Sean Walker
NISTS Annual Conference, January, 2012, Ft. Worth, Texas

Sharing Information:

This study extends the conversation on supplemental instruction (SI) in gateway stem courses in two ways. First, the study focuses specifically on the experience of STEM transfer students participating in SI and the impact that this has had both academically and socially for these students. Second, this student explores program effects specifically by gender and by URM status for transfer students. Implications of the student will be discussed in an open forum

Product Type:

Conference Presentation

Product Description:

"Supplemental Instruction and Student Success in an Introductory Biolgy Course," Sean Walker, Martin Bonsangue, Mark Filowitz, James Hershey, Hye Sun Moon, Edward Sullivan, William Hoese, Danielle Zacherl, Jennifer Burnaford
Society for Integrative and Comparative Biology (SICB) Annual meeting, January 2012

Sharing Information:

Improving student performance in introductory science and mathematics can lead to higher retention and graduation rates. We implemented a formal supplemental instruction (SI) program for the first course in the Biology major at California State University Fullerton starting in fall 2007. This course has the lowest pass rate of our introductory biology core classes, and even after successfully completing the course many students leave the major. Our SI program consists of one-hour sessions led by undergraduates who have done well in the course and apply to be in the program. The leaders undergo training and meet with the SI program coordinator weekly during the semester. Attendance is voluntary and students who come to a large percentage of SI sessions earn a small amount of extra credit (1 to 2 % of the total grade). We found that students attending SI scored higher on exams and were more likely to attain a C or greater in the course than non-attending students. To control for academic ability, High-School GPA or the student?s score on Lawson?s Classroom Test of Scientific Reasoning were used as covariates to analyze student performance. Taking these into account, there were still strong positive effects of SI attendance on performance. In addition, SI had strong positive effects on underrepresented minority students. Although we have not controlled for student engagement, our data suggest that SI is an effective way to improve student performance in introductory biology.

Product Type:

Poster

Product Description:

"Facilitating Transfer Student Success with Services and Programs,"Cathy Fernandez-Weston, Ricardo Lopez, Mark Filowitz,Rochelle Woods, Martin Bonsangue, Sean Walker

Sharing Information:

Western Regional Careers in Student Affairs Day, University of Southern California, October 2011

Product Type:

Poster

Product Description:

"TEST:UP, Talent Expansion in Science and Technology-An Urban Partnership," Cathy Fernandez-Weston, Mark Filowitz,Rochelle Woods, Martin Bonsangue, Sean Walker

Sharing Information:

Western Regional Careers in Student Affairs Day Conference, University of Southern California, October, 2011

Product Type:

Poster

Product Description:

"Facilitating Transfer Student Success with Services and Programs" Cathy Fernandez-Weston, Mark Filowitz, Rochelle Woods, Martin Bonsangue, Sean Walker

Sharing Information:

NASPA National Conference, March 10-14, 2012, Phoenix, AZ

Contributions

Contributions within Discipline:

Our project is currently completing its fourth year and we are presenting our presentations at conferences and plan to publish extensively in year 5 with our community college partners.

Increasing the numbers of STEM transfers to four-year institutions and the number of STEM baccalaureate degrees is of national significance and stand as the principal goals of this project. Various strategies for achieving these objectives are being used in two- and four-year colleges throughout the country. In TEST:UP, we are focusing on the developing approaches that prove most successful with the students that populate our three campuses. These populations are characterized by high numbers of: 1) traditionally under-represented students in STEM fields, 2) students with little or no parental college experience, and 3) students that come from low-income families. Moreover, our institutions are commuter campuses where students move back and forth between home, work, and school. It has historically been difficult to produce large numbers of STEM students from a student population dominated by these characteristics. Yet, increasingly in southern California and various parts of the country, campuses like our own are becoming more highly populated by students with these characteristics. Through TEST:UP, we hope to improve our understanding of the effectiveness of approaches to recruit, retain, and successfully transfer or graduate these students in a timely way.

Members of our TEST:UP team have been active in attending STEP PI meetings held by NSF as well as other meetings focusing on STEM transfer students and on student learning. We are working on more complete and robust analysis of TEST:UP program elements with our external evaluator with emphasis on STEM advisement at the two-year colleges and Supplemental Instruction outcomes for enrolled students as well as the impact of participation on the peer facilitators. One of our goals is to work with individualized data to eventually predict the characteristics of entering freshmen and transfer STEM students who will most benefit from programs that facilitate their transition to CSUF. The idea is to target these students and to institutionalize those best practices of our program that enable the retention and persistence of these students.

We now have substantial evidence that Supplemental Instruction (SI) is assisting students to pass and improve their grades in traditional gateway courses in mathematics, science, and engineering. We have made sigificant inroads to institutionalizing SI at the community college partners and at CSUF. Dedicated facilities exist at all three institutions to conduct SI.

The techniques developed in advising, SI, creating learning communities, and providing services before and after transfer have been leveraged to form similar partnerships with three more community colleges (Cypress, Citrus, and Santiago Canyon-all HSI institutions) under a $6 million (STEM)2 grant from the Department of Education.

Contributions to Other Disciplines:

We are increasing knowledge among traditional STEM faculty of the importance of taking a more holistic approach in assisting STEM students, an approach that strongly involves student affairs. In addition, we are working with some success to increase dialogue within and between faculty in the various STEM disciplines focusing on the identification of best practices for achieving elevated student performance in STEM subjects. We have implemented Supplemental Instruction at the College of Engineering and Computer Science. In addition, we have expanded discussions of Supplemental Instruction among non-STEM disciplines (such as our Mihaylo College of Business and Economics) at CSUF and also transferring lessons learned from our new student orientations, study campaigns, and other activities designed to facilitate the transition of new students to the campus.

Contributions to Human Resource Development:

We are developing students and staff with increased skills and knowledge to work in the fields of STEM teaching and STEM recruitment/retention. In the second year of the grant, Gina Garcia, one of our original project staff, entered a Ph.D. program at UCLA to pursue dissertation work in these areas. We know that other TEST:UP participants are advancing their careers with knowledge and experience

obtained from our program. The current coordinator for STEM Transfer Student Services, Cathy Fernandez-Weston, was accepted into a Master's program in counseling at California State University Long Beach and began course work in May 2011 and received all A grades so far. This work was inspired by her work with the two partner community college counselors. Ricardo Lopez, who was hired for one year using re-purposed funds from the grant, has now applied his learned conseling skills to obtain full time employment at CSUF's Academic Advising Center.

An unplanned outcome of the SI program is the increased interest in teaching careers from undergraduate peer facilitators. We are working to quantify this and to explore relationships between SI facilitator experiences and increases in the number of students seeking to become math and science teachers. The CATALYST Center at CSUF has initiated a series of surveys with current SI leaders to better quantify the impact of the grant on their career choices.

Contributions to Resources for Research and Education:

We have developed improved advisement materials and roadmaps to guide STEM students in developing realistic plans to transfer from Mt. SAC and SAC to CSUF. We continue to develop SI materials to be shared among our participating campuses. In addition, we have established web based informational resources that will make STEM students more aware of careers, internships, and research opportunities. We have active websites for TEST:UP at all three institutions. We also have stimulated faculty and staff dialogue on means to improve the transition of entering STEM students on the CSUF campus.

Contributions Beyond Science and Engineering:

We continue to develop improved understanding of STEM programs and the needs of STEM students for counselors, advisers, and others on our campuses. In addition, we are working to increase the dialogue between STEM and non-STEM faculty about STEM students and opportunities, as well as with other persons who may work with or advise STEM students at our institutions. Our College of Engineering and Computer Science has adopted SI and the College of Business and Economics is planning to adopt SI as a tool to improve success in accounting and finance courses.Our evaluation of STEM transfer student transcripts and the pre-transfer and post-transfer surveys will increase our understanding of the obstacles that these students face and lead to better means to address and overcome those obstacles. One intriguing aspect is finding better ways to have transfer students want to accept and participate in the interventions offered to help them succeed. We are also evaluating better ways to track students from community colleges to four year institutions, and on-line advisement tools that better serve our populations.

Conference Proceedings

Special Requirements

Special reporting requirements:

We will provide data to demonstrate the need for and impact of improved advisement practices and procedures for STEM students, particularly on the two-year campuses.

The budget crisis in California forced 10% fewer enrollments in 2009-2010 and a large reduction in STEM class offerings; decreases in upper division transfer student admissions to CSUF occurred in fall 2009 followed by a sharp reduction in spring 2010 admissions (33 spring 2010 transfer admissions vs. 2,681 in spring 2009) due to the budget-driven need to control enrollment; reductions planned for 2010-2011 were temporarily alleviated by California's FY 2011 budget. For 2012 it is almost certain that severe budget driven reductions in upper division transfer student admissions will take place. These factors resulted in the number of STEM transfers from all community colleges to the Colleges of NSM and ECS decreasing since 2006-07, the year before we received STEP funding (e.g., 368 per academic year in 2006-2007; 324 in 2007-2008; 307 in 2008-2009; and 236 in 2009-2010). In 2010-2011 STEM total transfer enrollment in the two CSUF STEM colleges rebounded strongly with 447. For SAC and Mt. SAC, the same trend was apparent with 68 STEM transfers to CSUF per academic year in 2006-2007 (36 Mt. SAC, 32 SAC); 48 in 2007-2008 (23 Mt. SAC and 25 SAC); 38 in 2008-2009 (13 Mt. SAC and 25 SAC); 35 in 2009-2010 (13 Mt. SAC and 22 SAC); and rebounding to 58 in 2010-2011 (22 Mt. SAC and 36 SAC). CSUF has implemented impaction plans that raised the admission criteria for transfer students outside Orange County (3.7 GPA in 2010-2011 and 3.3 GPA in 2011-2012), our local admissions area. This contributed to the decline in incoming transfers from Mt. SAC, which is in Los Angeles County outside of our service area, during 2009-2010. However, 2010-2011 was a rebound year as described above and we attribute this in part to re-opening of spring admissions in 2011 and TEST:UP efforts counteracting the impaction barriers. Budget difficulties in California make the numbers of transfers to be admitted to CSUF during 2011-2012 uncertain at this time. The State budget has not yet been finalized and signs are not encouraging. So we might not expect any spring 2012 admits as was done in 2010.

Collective bargaining agreements at the community colleges specify the roles of counselors and faculty members. Faculty members are

generally not allowed to be directly involved in the advisement process. This makes it difficult to impress on students the hierarchical nature of STEM curricula, requiring prerequisite courses to progress on to upper division courses at the four-year institutions. With cooperation from the Deans at Mt. SAC and SAC, the influence of our on-site counselors, and weekly visits by our Coordinator for STEM Transfer Student Services, we have succeeded in breaking down some of these traditional barriers, despite considerable resistance at the outset.

We found that transfer students are not very receptive to intrusive interventions, like our early warning system. They believe that they do not need it and/or that they are so used to less help that they do not see the need to change. Community colleges do not always have the data infrastructure to provide a number of information items we need to track students. Some do not have email or other means to communicate with students. Most difficult is determining transfer statistics for students who move on to four-year institutions; indeed information from the community colleges is based on exit interviews, as noted previously. National Student Clearinghouse information was found to be inaccurate. Due to a number of issues, including illness of key personnel, the program got off to a slow start at Mt. SAC. The unspent funds at Mt. SAC from years one and two were re-purposed. Mt.SAC has improved its activity in year three and with addition of Dr. Iraj Nejad to the project Mt. SAC will now be moving forward even more rapidly with TEST:UP programs.

We believe that we are achieving success and we can increase or even maintain our rate of success in elevating student performance in our entry level STEM courses as a result of TEST:UP programs despite the cuts in State resources.

Change in Objectives or Scope: None

Animal, Human Subjects, Biohazards: None

Categories for which nothing is reported:

Organizational Partners

Any Journal

Any Book

Any Conference

Attachment 1. Strategy/Activity	2007-2008	Year 1/2008-2009		Year 2/2009-2010		Year 3/2010-2011		Year 4/2011-2012	
	Baseline Year	Target	Actual	Target	Actual	Target	Actual	Target	Actual
Increase STEM 4 yr Transfers and AA Degrees Awarded Target: +25 per year per CC	691	741	756	806	795‡	856	962	1012	NA
SAC	226	251	246	271	204‡	296	239	321	
Mt. SAC	465	490	510	535	591	616	666	691	NA NA
CC STEM Transfers to CSUF[1] Target: +40 per year	48	88	38	78	35	75	58	98	45
SAC	25	45	25	45	13	33	36	56	33
Mt. SAC	23	43	13	33	22	42	22	42	12
New CC Declared STEM Majors Target: +20-40 per year	1736	1776-1796	1861	1901-1941	1736‡	1979-2009	2168	2208-2248	2294
SAC	1099	1119-1129	1185	1205-1225	1022‡	1245-1265	1359	1379-1399	1417
Mt. SAC	632	652-662	676	696-716	714	734-744	809	829-849	877
STEM Degrees Awarded at CSUF for Transfer Students [2] (Target: +40 per year)	223	223	235	235	213	253	214	254	NA
CSUF Grad Students Teaching at the Community College	0	4	0	4	1	4	3	4	3
CSUF STEM Major Retention- % First Time Freshmen [3]									
NSM		None	59.0%	None	68.4%	None	66.2%	None	NA
ECS		None	50.8%	None	67.8%	None	69.2%	None	NA
Transfer Students									
NSM	70.6%	None	65.5%	None	70.8%	None	68.7%	None	NA
ECS	58.0%	None	50.7%	None	70.4%	None	67.8%	None	NA
All STEM Transfers	67.9%	None	63.4%	None	71.1%	None	68.7%	None	NA

Supplemental Instruction Impact (with SI vs no SI) [4] CSUF[5] all courses Math Passing rate GPA Biology Passing Rate GPA SAC (avg) Biology Grade % Retention % Math Grade% Retention % Mt. SAC Math Passing Rate GPA Sciences Passing rate GPA			 89% vs 74% 2.70vs2.18 84% vs 74% 2.40vs2.32		 82% vs 69% 2.40vs 1.90 Not anal 2.97vs 2.25 83% vs 69% 92% vs 71% 91% vs 78% 96% vs 80% 86% vs 79% 2.58vs 2.41 88% vs 79% 2.66vs 2.40		 74%vs 49% 2.25vs1.50 83% vs57% 2.82vs3.03 79%vs69% 92%vs79% 83%vs78% 85%vs 70% Under Analysis Under Analysis	

Appendix Notes:

‡ Computer system change in 2009-2010 at SAC may have caused missing count in AA degrees/ 4 yr transfers and declared STEM majorsMany students at community colleges do not get an AA degree prior to transfer

1. Negative impacts of 10% enrollment reductions and almost no spring transfers in 2009 or 2010 and impaction effect on Mt.SAC where out of service area transfers required GPA of 3.7 or higher in 2010 and 3.3 or higher in 2011.
2. Only 54% of NSM STEM transfers and 40% of ECS STEM transfers graduate in four years or less after transfer. Therefore, full impact of the TEST:UP program on targeted graduation rates is unlikely to be observed as yet.
3. Impact of programs on retention of first time freshmen STEM majors is an intermediate indicator. Transfer student retention included for 2010-2011
4. SI data are provided as intermediate indicators. TEST:UP is funding SI at the community college partners, and funded at CSUF in spring 2011.
5. 2010-2011 CSUF SI data include for math: college algebra, pre-calculus, calculus 1 and calculus 2; and for Biology Biodiversity and Evolution and Cellular Basis of Life