Implementing the 2016 AIMS2 Project Evaluation

Nathan Durdella January 2017
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Evaluating the AIMS2 Program

- Program evaluation: general considerations
- Evaluation design and procedures
- Implementing the evaluation: initial steps
- Evaluation timeline: early project period
Evaluating programs

- A systematic and rigorous investigation of a program, process, or event
  - Social science research methods
    - Data collection + analysis
  - A framework for informing decision making and improving program processes (formative) and outcomes (summative)
    - Interpreting performance measures
Outcomes evaluation

- Examines how program participation shapes participants
  - Generally documents changes that occur in participants
- Focuses on program effectiveness
  - Did the program succeed? If so, what program components were most effective?
Documenting program effectiveness

**Evaluation framework**
- Social and behavioral science framework
- Empirical, generalizable knowledge that advances body of evidence to enhance educational practices
- Result: resource-intensive, highly-coordinated evaluation activities

**Specific requirements**
- Competitive Preference Priority (2) USDE HSI-STEM =
  - Moderate evidence of effectiveness
    - Test participants prior to and after participation AND compare to a test of non-participants across multiple sites directly related to target population!
Evaluation framework

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Evaluation design

AIMS²
Attract Inspire Mentor
Support Students

HSI STEM Grant Program

DEPARTMENT OF EDUCATION
UNITED STATES OF AMERICA

INSTITUTE OF EDUCATION SCIENCES
Logic model guides evaluation

Visual representation of a systematic approach to linking program components to outcomes
Logic model guides evaluation

Visual representation of a systematic approach to linking program components to outcomes

Road map for success

What's the difference?
- Activities / OUTCOMES
  - Who, what, when with participants
  - Evaluate program strengths, weaknesses, etc.
- Outcomes / PRODUCTS
  - How many participants served and what produced in activities
  - A faculty research project where 12 students...
- Outcomes / BENEFITS
  - Direct or indirect participation in activities associated with sessions
  - Students learned or gained, etc.

What goes in?
- Problems are issues that the program addresses
- Resources / Inputs are materials needed for activities
- Activities are steps in program implementation
- Outputs are products of program activities
- Outcomes are changes in program participants' knowledge, beliefs, or behaviors
- Impacts are long-term outcomes
Key components

Resources/Inputs → Activities → Outputs → Outcomes → Impact

Your Planned Work

Your Intended Results

Create a "logic model"

As the logic model repair shop ...

Here is our new simplified logic model!

So, I'm guessing this is for a comprehensive program-level information...
Create a "logic model"

Here is our new simplified logic model

Give us $  |  We all WIN
At the logic model repair shop...

So, I'm guessing this is for a comprehensive program-level intervention

freespectrum.com
What goes in?

- **Problems** are issues that the programs addresses
- **Resources/inputs** are materials needed for activities
- **Activities** are steps in program implementation
- **Outputs** are products of program activities
- **Outcomes** are changes in program participants’ knowledge, beliefs, or behaviors
- **Impacts** are long-term outcomes
What's the difference?

- **Activities** = STEPS
  - *Who, what, where with participants*
    - Faculty meet with students weekly etc....
- **Outputs** = PRODUCTS
  - *How many participants served and what produced in activities*
    - A faculty research project where 10 students...
- **Outcomes** = BENEFITS
  - *Direct benefits from participation in activities associated with outputs*
    - Students learned or gained or etc.
Road map for success

Logic Model for Bridging the Gap: Enhancing AIMS² for Student Success

Problems

Current Conditions
- Students challenged to achieve accreditation
- Students overwhelmed by course management
- Information overload
- Faculty workload
- Student experience of crisis

Resources/Impact

Financial Support
- Student resource development
- Faculty support for project activities

Intellectual Resources
- Library: Resources and databases
- Research seminars and workshops
- Student experiences of success

Peer Mentoring and Tutoring
- Peer and professional tutors
- Improve communication

Academic Support
- Program success
- Calculus in college
- Academic skills

Physical Resources
- Library
- Social aspects

Business Partner
- Advisory board
- Regional employers

Current Practices
- Minimal student contact
- Lack of student success
- Undergraduate research opportunities

Student Faculty Mentoring Relationships
- Student-faculty interaction
- Mentoring relationships

Student-Faculty Mentoring
- Faculty mentoring
- Graduate student research

Activity

Outcomes

Student-Aligned and Behavioral Changes
- Student success
- Graduation rates
- Increased contact

Transfer and Career Success
- Transfer student success
- Graduation rates

Career Preparation
- Professional experiences
- Career success

Career and Pre-Professional Experiences
- Professional experiences
- Graduation rates

Outcomes: Short-Term

Impacts/Outcomes: Long-Term

Student Transfer, Graduation, and Post-Graduation Success
- Development of long-term
- Employment and professional development
- Graduation rates
- Career success
- Long-term success

Student Research Skills
- Development of skills
- Knowledge of research

Career Preparation Skills
- Professional readiness
- Career success

Internal Data
- Program success
- Student satisfaction

External Data
- Program success
- Student satisfaction

Contextual Factors
- Discipline-based research
- Community colleges
- Academic and social support
Project objectives

- Improve the **transfer** of Hispanic and low-income students in engineering and computer science fields to baccalaureate-granting institutions.
- Improve **academic achievement** of Hispanic and low-income students in engineering and computer science fields.
- Enhance **faculty and peer environments** for Hispanic and low-income students in engineering and computer science fields.
- Improve **career preparation** of Hispanic and low-income students in engineering and computer science fields.
- Develop **research skills** of Hispanic and low-income students in engineering and computer science fields.
- Increase **baccalaureate degree completion** of Hispanic and low-income students in engineering and computer science fields.
Focus on outcomes

Transfer
Academic achievement
Faculty and peer environments
Career preparation
Research skills
Baccalaureate degree completion
Outcomes

performance measures

Developed by USDE + articulated in 2016 HSI-STEM RFP = common set of measures

Community colleges
- % and number of Hispanic and low-income, full-time STEM students enrolled
- % Hispanic and low-income, first-time STEM students in 1st year in previous year + enrolled in 2nd year in STEM program
- Number of Hispanic and low-income students in project
- % Hispanic and low-income students in project who successfully completed gateway courses
- % Hispanic and low-income students in project in good academic standing

CSUN
- % and number of Hispanic and low-income, full-time STEM students enrolled
- % of Hispanic and low-income student transfers in STEM
- Number of Hispanic and low-income students in project
- % Hispanic and low-income students in projects who successfully completed gateway courses
- % Hispanic and low-income students in project in good academic standing
- % of Hispanic and low-income STEM transfer students on track to complete degree after 3 years
- % of Hispanic and low-income students in project who completed a degree
Community colleges

- % and number of Hispanic and low-income, full-time STEM students enrolled
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- % of Hispanic and low-income students in STEM projects
- % Hispanic and low-income students in good standing in project
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- % of Hispanic and low-income student transfers in STEM
- Number of Hispanic and low-income students in project
- % Hispanic and low-income students in projects who successfully completed gateway courses
- % Hispanic and low-income students in project in good academic standing
- % of Hispanic and low-income STEM transfer students on track to complete degree after 3 years
- % of Hispanic and low-income students in project who completed a degree
Focus on outcomes

Objectives and Measures

Objective 1: Improve the academic achievement of Hispanic and low-income students in engineering and computer science fields.

Performance Measure (1.1): The percent of Hispanic and low-income students who participated in grant-supported services or programs who successfully completed gateway courses.

Performance Measure (1.2): The percent of Hispanic and low-income students who participated in grant-supported services or programs in good academic standing.

Outcome Measure (1.3): Improvements in student success (non-cognitive) skills.

Objective 2: Enhance faculty and peer environments for Hispanic and low-income students in engineering and computer science fields.

Performance Measure (2.1): The number of Hispanic and low-income students participating in grant-funded student support programs or services.

Outcome Measure (2.2): Improvements in self-reports of quality, quantity, and effects of student-faculty and peer-peer interaction.

Objective 3: Improve the transfer of Hispanic and low-income students in engineering and computer science fields to baccalaureate-granting institutions.

Performance Measure (3.1): The percentage change, over the five-year grant period, of the number of Hispanic and low-income, full-time STEM field degree-seeking undergraduate students enrolled.

Performance Measure (3.2): The percentage of Hispanic and low-income, first-time STEM field degree-seeking undergraduate students who were in their first year of postsecondary enrollment in the previous year and are enrolled in the current year who remain in a STEM field degree/credential program.

Objective 4: Improve career preparation of Hispanic and low-income students in engineering and computer science fields.

Outcome Measure (4.1): Gains on measures of self-perceptions, attitudes, and skills related to career.

Objective 5: Develop research skills of Hispanic and low-income students in engineering and computer science.

Outcome Measure (5.1): Gains on measures of self-perceptions, attitudes, and skills related to research from URSSA surveys and interviews.

Objective 6: Increase baccalaureate degree completion of Hispanic and low-income students in engineering and computer science fields.

Performance Measure (6.1): The percentage of Hispanic and low-income students transferring successfully to a four-year institution from a two-year institution and retained in a STEM field major.

Performance Measure (6.2): The percent of Hispanic and low-income STEM field major transfer students on track to complete a STEM field degree within three years from their transfer date.

Performance Measure (6.3): The percent of Hispanic and low-income students who participated in grant-supported services or programs and completed a degree or credential.
Evaluation design

HSI STEM Grant Program

Institute of Education Sciences
Dual design
Quasi-experimental

Observational

Retrospective:
Subjects are selected and then their past conditions are observed

Prospective:
Subjects are followed to observe future outcomes
Dual design

Quasi-experimental

Experimental Group

Pre-test → Intervention → Post-test

Non-random assignment of students to groups

Control Group

Pre-test → Standard Instruction → Post-test

Non-random group assignment

Observational
Non-random group assignment

Intervention group = AIMS2 project participants as FTF and FTT

Comparison group = Non-AIMS2 project participants in CECS as FTF and FTT
Dual design
Quasi-experimental

Experimental Group

Non-random assignment of students to groups

Control Group

Pre-test

Intervention

Post-test

Non-random group assignment

Observational
Observational

Retrospective:
Subjects are selected and then their past conditions are observed

Prospective:
Subjects are followed to observe future outcomes
Evaluation procedures

- Data sources include students and graduates
  - Community college, CSUN, CSUN graduates
- Mixed-methods approach with survey research and interview procedures
Mixed methods approach

Focus groups with AIMS2 participants at community colleges and CSUN and math participants at CSUN

Personal interviews with CSUN AIMS2 program graduates

Engineering Majors Survey (EMS)

Institutional data to: (a) explore patterns of AIMS2 and math participation, course enrollment, course success, and program completion and (b) match to EMS data for more robust data set

Undergraduate Research Student Self-Assessment (URSSA)
S asks respondents about their innovation self-efficacy, expectations for outcomes of innovative behaviors and rests and goals around doing innovative work in their early careers.”

The five sections as follow: current plan of study; school experiences; beliefs, expectations, and interests; future career goals; and background.

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EMS asks respondents about their "innovation self-efficacy," expectations for the outcomes of innovative behaviors and interests and goals around doing innovative work in their early careers"--with five sections as follow:

1. current plan of study;
2. school experiences;
3. beliefs, expectations, and interests;
4. future career goals; and
5. background
URSSA asks respondents about their:
1. skills such as lab work and communication;
2. conceptual knowledge and linkages in their field;
3. deeper understanding of the intellectual and practical work of science;
4. growth in confidence and adoption of the identity of scientist;
5. preparation for a career or graduate school in science;
6. greater clarity in understanding what career or educational path students might wish to pursue.

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Focus groups with AIMS2 participants at community colleges and CSUN and math participants at CSUN
Personal interviews with CSUN AIMS2 program graduates
Implementing the evaluation

- Human subjects protocol approval
- Initial data collection and analysis: survey and interview pilot tests
- Institutional data coordination and production
- Interim and annual compliance reporting
- Coordination of CSU Systemwide HSI-STEM Summative Evaluation
Human subjects protocol approval

**CSUN IRB**
- Important protocol requirements:
  - Subject recruitment
  - Procedures
  - Risks and benefits
  - Confidentiality: data storage, management, and use
- **Good news!** Low risk and non-vulnerable population
- **Great news!** Expedited chair or designated member review, requests for revisions, and approval

**Letter of permission**

**Subject recruitment and data collection**
- CSUN's IRB requires documentation that researchers have permission to recruit participants and collect data off campus
- AM52 participant focus groups on community college campuses and use of community college institutional data qualifies for letter of permission

**Permissions from community colleges**
- Group interviews:
  - Participant recruitment via email and flyer invitations
  - Field test and conduct group interviews for assessment of project performance measures and annual reporting
- Institutional data:
  - Coordination of institutional data requests with IT offices
  - Permission to use de-identified aggregate institutional data for assessment of project performance measures and annual reporting
CSUN IRB

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Permissions from community colleges

**Group interviews**
- Participant recruitment via email and flyer invitations
- Facilities to conduct group interviews for assessment of project performance measures and annual reporting

**Institutional data**
- Coordination of institutional data requests with IR offices
- Permission to use de-identified, aggregate institutional data for assessment of project performance measures and annual reporting
Letter of permission

SAMPLE

{Letter must be on letterhead with original signature of authorized official}

Date

California State University, Northridge
Standing Advisory Committee for the Protection of Human Subjects
18111 Northoff Street
Northridge, CA 91330-8232

Dear Committee Members:

{Insert your name(s)} has permission to conduct the project entitled {insert title of project here} at {insert name of facility}. I have reviewed the project and am aware of all the activities involved in the project including {list all that are applicable, e.g., surveys, interviews, reviewing student records}.

Signed,

{Insert name and title of authorized official}

Complete, sign, scan, and email to me!

Community college IRBs

If your campus has an IRB committee or office, please share with me. I'll need to work with your campus officer and you to coordinate approval.
Complete, sign, scan, and email to me!
Community college IRBs

If your campus has an IRB committee or office, please share with me. I'll need to work with your campus officer and you to coordinate approval.
Santa Clarita Community College District Institutional Review Board

The Santa Clarita Community College District Institutional Review Board is charged with protecting the rights and welfare of human research subjects for projects in which the District is engaged.

Guided by the principles of The Belmont Report: Ethical Principles and Guidelines for the Protection of Human Subjects of Research, the SCCCD IRB reviews all human research protocols in accordance with federal regulations, State laws, and local and District policies. The SCCCD IRB is comprised of members from various disciplines in the social/behavioral sciences, biological/physical sciences, nursing, institutional research office, and community/lay members (as needed) to assure a comprehensive review process. Through a collaborative partnership, the SCCCD IRB assists investigators in the protection of human subjects. These subjects are truly a scarce resource, worthy of our gratitude, respect, and protection. The District is committed to conducting its behavioral research involving human subjects under rigorous ethical principles.

Note to outside investigators: At this time the online submission process is not open to investigators that are not employed by the Santa Clarita Community College District (SCCCD). Non-SCCCD investigators involved in human subjects research that seek to access any SCCCD facilities, students or personnel (faculty, staff or administrators) must secure sponsorship from a SCCCD faculty, staff or administrator who will be responsible for submitting the proposal on their behalf. To help the SCCCD faculty, staff or administrator in submitting a proposal it is recommended that an electronic copy of the IRB proposal form from the home institution and a copy of the approval letter must be provided to the co-chairs, if applicable.
Initial data collection and analysis
Survey and interview pilot tests

- Adapt EMS and URSSA toAMS2 program contexts
  - Initial administration of EMS (pretest) in Spring 2017 and URSSA (posttest) in Summer 2017 will be exploratory to confirm that the items that we ask are appropriate.
- Develop protocols for group interviews (student participants) and personal interviews (graduates)
- Pilot instruments with first few interviews and revise as needed = add follow-up questions as main questions, etc.
Institutional data coordination and production

Annual production of performance measure data for assessment and compliance

- % and number of Hispanic and low-income, full-time STEM students enrolled
- % Hispanic and low-income, first-time STEM students in 1st year in previous year = enrolled in 2nd year in STEM program
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- % Hispanic and low-income students in project in good academic standing
Community college IR data requests = aggregate data only for annual compliance report

Collaborate with you to coordinate and submit requests!

We've successfully collaborated with AIMS2 CoC and GCC team members to support data for APR measures in the 2011 award!
Interim and annual compliance reporting

• Typically, we prepare and submit an annual performance report in the fall term for the previous project period.
• This project year, we will prepare multiple reports to comply with USDE requirements
  • 2016 interim and annual
  • 2011 final and possibly annual
CSU Systemwide HSI-STEM Summative Evaluation

- System efforts to examine effects of program participation
- Coordinate data IR requests, participate in meetings, interviews, etc.

2016 CSU awardees:
- Bakersfield
- Channel Islands
- Chico
- Dominguez Hills
Human subjects protocol and evaluation development

- IRB protocol development, submission, and approval
- Survey instrumentation: Engineering Majors Survey (EMS)
- Coordination and planning of data collection activities
- Compliance reporting schedule production
Survey pilot and interim reporting

- Pilot administration of EMS with Spring 2017 AIMS2 FTF Cohort
- Instrumentation: focus group and personal interview protocols
- Production of 2016 Interim Year 1 Report--due in April
- Coordination of institutional data requests across sites
Focus group interviews and data processing

- Exploratory focus group interviews with Spring 2017 AIMS2 FTF Cohort
- Telephone interview pilot with AIMS2 cohort graduates
- Survey instrumentation: Undergraduate Research Student Self-Assessment (URSSA)
- Data processing/descriptive analysis: EMS
Survey pilot and data processing

- URSSA pilot with AIMS2 faculty summer research student participants
- Transcription of exploratory focus groups and telephone interviews
- Descriptive data analysis of student achievement measures with institutional data from Spring 2017
Instrumentation and survey administration

- EMS instrumentation: revisions from survey pilot and EMS administration with Fall 2017 AIMS2 FTT Cohort et. al.
- Thematic data analysis of focus groups and personal interviews
- IR data request coordination for CSU Systemwide HSI-STEM Summative Evaluation
Data analysis and report development

- Performance report production:
  - 2011 Year 6 Annual Performance Report
  - 2011 Final Performance Report
  - 2016 Annual Performance Report
- Institutional data and survey data analysis and display
Implementing the 2016 AIMS2 Project Evaluation

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