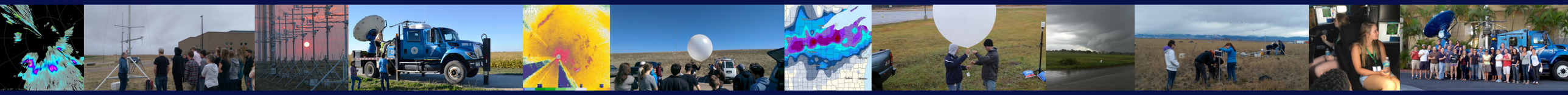
Broadening Participation in Atmospheric Science Through A Program Needs Assessment

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Overview

Primary Research Question

How can a needs assessment be used to broaden participation in the Lower Atmosphere Observing Facility (LAOF) Educational Deployment Program?

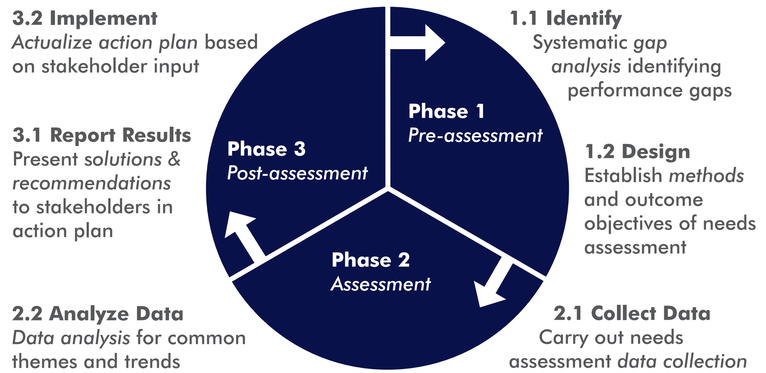
Survey Groups

1. **Prospective Principal Investigators (PI):** People who have expressed interest in the program but yet to submit a proposal (*N=10*)
2. **Former PI:** PIs who have previously been granted an educational deployment on their campus (*N=36*)
3. **NSF and NCAR Stakeholders:** Staff from the National Science Foundation and National Center for Atmospheric (*N=8*)

Instruments

- In-person and phone interviews
- Online surveys
- Archived report analysis

Methodology



1.1 Identify
Systematic *gap analysis* identifying performance gaps

1.2 Design
Establish *methods* and outcome objectives of needs assessment

2.1 Collect Data
Carry out needs assessment *data collection*

2.2 Analyze Data
Data analysis for common themes and trends

3.1 Report Results
Present *solutions & recommendations* to stakeholders in action plan

3.2 Implement
Actualize action plan based on stakeholder input

Data Analysis

Qualitative and quantitative data was categorized into four main themes:

1. Background data
   - » Program overview data
   - » Distribution of requesting PIs and Universities
   - » Requested Facilities
   - » Annual budget analysis
2. PI perception and understanding of the program
   - » Awareness of available LAOF
   - » Program goals
3. Faculty and university factors
   - » Existing facilities available on campuses
   - » PI factors
   - » University factors
4. User-perspective program enhancements.
   - » Program enhancements

Program Background & Motivation

- » The National Science Foundation (NSF) Lower Atmosphere Observing Facilities Educational Development Program is a short-term facilities deployment program designed to strengthen STEM-related education by providing access to nine separate research facilities to educators for authentic instruction in the field of observational meteorology and engineering.
- » Facilities can be made accessible for graduate, undergraduate and K-12 education, including the deployment of a facility to a university for up to three weeks.
- » Anomalies in the diversity of requested facilities and requesting Principal Investigators (PIs) found in the 46 deployments from 2008-2015 motivated the needs assessment to determine if the needs of the community are being met, a vital first-step to improve program performance.

Assessment vs Evaluation

Table 1: Summary of key differences between assessment and evaluation[1]

Dimension of Difference	Assessment	Evaluation
Content: timing, primary purpose	*Formative*: ongoing, to improve a situation	Summative: final, to gauge quality
Orientation: focus of measurement	*Process-oriented*: how the process is going	*Product-oriented*: what's being processed
Findings: uses thereof	*Diagnostic*: identify areas for improvement	*Judgmental*: arrive at an overall grade/score

- » Assessment provides information for formative program improvement, and the information gathered in the process can be used to make changes to desired outcome, and used diagnostically to identify areas of improvement[2]
- » Evaluation is a summative process used to gauge quality, with the findings used to arrive at an overall judgment[1]

[1]Assessment of Student Learning in STEM disciplines. (n.d.) A Duke Univ. 'Teaching IDEAS workshop' presented by E. Neal, Ph.D. Dir. of Faculty Dev, Center for Teaching and Learning, U of NC.)
[2]Angelo, T and Cross, K.P. 1993. Classroom assessment techniques a handbook for college teachers. Jossey-Bass A Wiley Imprint, San Francisco, CA.

Results & Value

- » Data show the high request rate of the anomalous facility is likely representative of the community.
- » Data show the request rate for PIs is not reflective of the user community, and gaps do exist.
- » When combined with the implementation of the suggested recommendations, these efforts should increase the diversity of participant and the facilities that are used leading to the broadening of participation in the program and increasing the use of a subset of LOAF
- » A data-driven needs assessment is viable and valid method to improve program performance and broaden participation
- » Professional development gains:
  1. A greater understanding of the differences between and when to apply a needs assessment and a program evaluation
  2. Building of professional network through communications and interest in PI perceptions of program

Citations:
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NSF Logo | http://www.nsf.gov/policies/logos.jsp. (n.d.). Retrieved December 1, 2015.
EOL Logo | https://internal.eol.ucar.edu/content/eol-logos. (n.d.). Retrieved December 1, 2015.
MSU MSSE Logo | http://www.montana.edu/msse/capstones.html (n.d.). Retrieved December 1, 2015.
NCAR Logo | https://wiki.ucar.edu/display/wag/Logos for Web and Print. (n.d.). Retrieved December 1, 2015.