The Undergraduate Research and Mentoring Experience
Rosa Buxeda, Lueny Morell
Jorge I. Vélez
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Ponce Hilton

Adapted in part from the UTEP Affinity Group Model
Agenda

• The PaSCoR Process
• Research objectives and The process
• Exercise I: Challenges
• The creation of a research team
• Exercise II: The mentor
• Mentoring is a personal relationship
• The Affinity group model
• Exercise III: The Affinity group model
• Exercise IV: The PaSCoR affinity research group model
The NASA PaSCoR Project

- Two main goals:
  - Curriculum Development
  - Undergraduate Research & Student Mentoring
<table>
<thead>
<tr>
<th>YEAR/ACTIVITIES</th>
<th>YEAR 1</th>
<th>YEAR 2</th>
<th>YEAR 3</th>
<th>YEAR 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recruitment &amp; Curriculum</strong></td>
<td>1. Awareness (1) (Univ 101, other)</td>
<td>PaSCoR Courses</td>
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<td>2. Selection of 35 students (1)</td>
<td>• Int. to RS (1)</td>
<td>• Advanced courses in SMET disciplines: Geology, Math, Agricultural Sciences, ECE</td>
<td>• Undergraduate Research with mentor in a team (advanced undergraduate students &amp; faculty)</td>
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<td>3. Mentor Assignment (1)</td>
<td>• Int. to GIS (2)</td>
<td>• Undergraduate Research with mentor in a team (advanced undergraduate students &amp; faculty)</td>
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<td>4. Seminars &amp; Workshops (2)</td>
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<td><strong>Undergraduate Research</strong></td>
<td>• Summer Station Workshop (2)</td>
<td>• Undergraduate Research with mentor in a team (advanced undergraduate students &amp; faculty)</td>
<td>• Selection of 5 students for Summer Internships</td>
<td>• Undergraduate Research with mentor in a team (advanced undergraduate students &amp; faculty)</td>
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<tr>
<td><strong>Outreach</strong></td>
<td>Technical Presentations in local, national &amp; international forums (e.g., Junior Tech Meeting, CRC, ADMI, Annual PaSCoR Fair)</td>
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<td>• Submission of Paper for Publication</td>
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<td></td>
<td>• PaSCoR Research Presentation</td>
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<td>• RS-GIS Certificate Ceremony</td>
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<tr>
<td><strong>Student Counseling</strong></td>
<td>Academic &amp; Professional Counseling (1,2)</td>
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The PaSCoR Student “Process”

Program Starts
Summer Station

Seminars & Workshops

Annual PaSCoR Fair

Research

Four Courses

Mentorship

Program Ends
Internship

Team skills
Research skills
Communication skills
Ethics

Oral presentation
Poster presentation
Industry evaluation

Four Years
Objectives of the UG Research & Mentoring Experience

- Provide practice-based, hands-on experience integrated to the RS/GIS curriculum
- Attain higher level of competence in SMET programs
- Understand scientific & research methodology
- Help students make informed judgments about scientific & technical matters
- Develop teamwork & communication skills
- Motivate students to pursue graduate studies
Exercise I
What challenges exist to effectively implement the UG Research & Mentoring Experience?

• Make a list of 5 factors
Challenges

• Lack of domain expertise
  – Knowledge & skills
• Time investment
• Requires continuous commitment to tasks
• Setting clear, realistic goals
• Recruitment of competent but not so confident students
• Other?
Steps to integrate students in a research team

• Identify potential students (freshman +) when & who??
  – UNIV 101
  – Recruitment meetings
  – Complete form

• Select 45 students when & who ??

• Summer Station Workshop
Steps to integrate students in a research team

- Assign students to affinity research group (mentor & team) when & who??
- Mentor year-round by faculty
- Advanced undergraduates
  - 2 semester research stipend
  - Paid Summer internship
PaSCoR ... from Space

Exercise II
Identify a mentor in your career.

- List his/her characteristics, attributes, and attitudes.
- Describe mentoring activities & interaction.
Affinity Research Group Model

Research & Technical Skills

Teamwork & Communication Skills

Mentors/Role Models

Goals

Faculty-Student Interaction

Increase retention

Increase student research

Facilitate student research

Adapted from UTEP’s Affinity Model
Affinity Group Model Components

- Orientation
- Training
  - Skills (e.g., teamwork, communication)
  - RS/GIS technical areas
- Research project framework
- Define expectations & variables
- Weekly meetings
- Monthly meetings
- Poster/paper presentations
- Other?
Orientation

• Purpose
  – Facilitate assimilation of new students
    • Philosophy & goals
  – Increase ownership of research

• Benefits
  – Understand basic/group research skills
    • Scientific methodology
    • Ethics
    • Cooperative group skills
    • Competing concerns
Training

• Purpose
  – Provide technical & soft skills development

• Benefits
  – Accelerate RS/GIS training
  – Accelerate integration into research group
Research Project Framework

- **Purpose**
  - To provide a framework in which the students can realize the relevance of their assignments

- **Description**
  - Define mission & goals
  - Map tasks to goals
  - Define activities & timeline
  - Promote project & time management

- **Benefits**
  - Understand the importance of work
  - Understand the steps toward completing tasks
  - Facilitate setting goals & balancing time
Define Expectations & Variables

• Purpose
  – To define milestones for the project

• Description
  – Associate deliverable with assigned task
  – Provide constructive criticism of deliverable
  – Examples; presentation, critical review, summary, literature review

• Benefits
  – Develop domain expertise
  – Sharpen technical & communication skills
  – Contribute tangibly to project
  – Structures individual accountability
  – Track progress
Weekly Meetings

• Purpose
  – To report progress, promote refinement of weekly goals, solve problems & discuss research

• Benefits
  – Promote positive interaction
  – Structure individual accountability
  – Practice team & communication skills
  – Develop domain expertise skills
  – Evaluate goals, tasks & methodology
Monthly Meetings

• Purpose
  – To integrate research results, bring students together & develop higher-level thinking skills

• Description
  – Recognize students
  – Inform team of research
  – Teach & practice higher-level skills

• Benefits
  – Foster cooperation
  – Transfer results
  – Develop domain expertise
  – Practice skills
Exercise III
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<th>Area</th>
<th>importance assessment</th>
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<td>Orientation</td>
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1 = low >>> 5 = high

Area importance assessment

1 = low >>> 5 = high
Researcher Profile

• Research area (keywords)

• Current research projects (grant source)
  1. ___
  2. ___
  3. ___
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Researcher Profile...

Students in UG Research

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<tr>
<th>NAME</th>
<th>TASK</th>
<th>TITLE OF PROJECT</th>
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Current mentoring activities

• Describe *your mentoring mission* or *your* current mentoring activities...
Future research projects

- Make a list of possible UG Research projects
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Exercise IV
PaSCoR … from Space

Our Own PaSCoR Affinity Research Group Model?

Adapted from UTEP’s Affinity Model
Identify
Recruit
Develop
Support

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Success