



DEVELOPING THE NEXT-GENERATION RESEARCHER THROUGH INCLUSIVE EXCELLENCE

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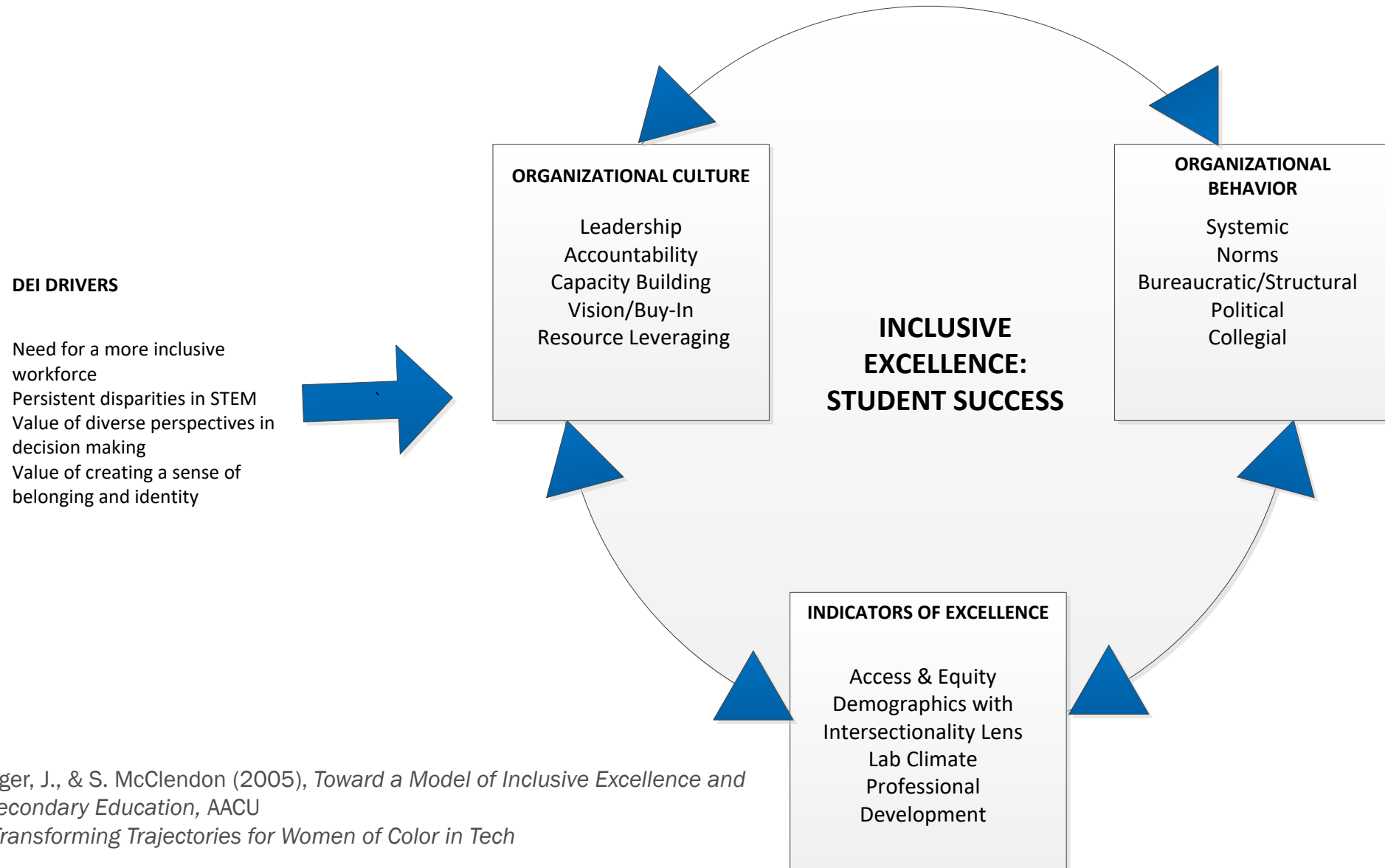
Director of the Computing Alliance
of Hispanic-Serving Institutions, an
NSF INCLUDES Alliance



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CNS- 1551221

DOE Laboratories of the Futures 1/25/2022

BIG PICTURE: DIMENSIONS OF INCLUSIVE EXCELLENCE



Williams, D., Berger, J., & S. McClendon (2005), *Toward a Model of Inclusive Excellence and Change in Postsecondary Education*, AACU
NASEM (2021) *Transforming Trajectories for Women of Color in Tech*
actreport.com



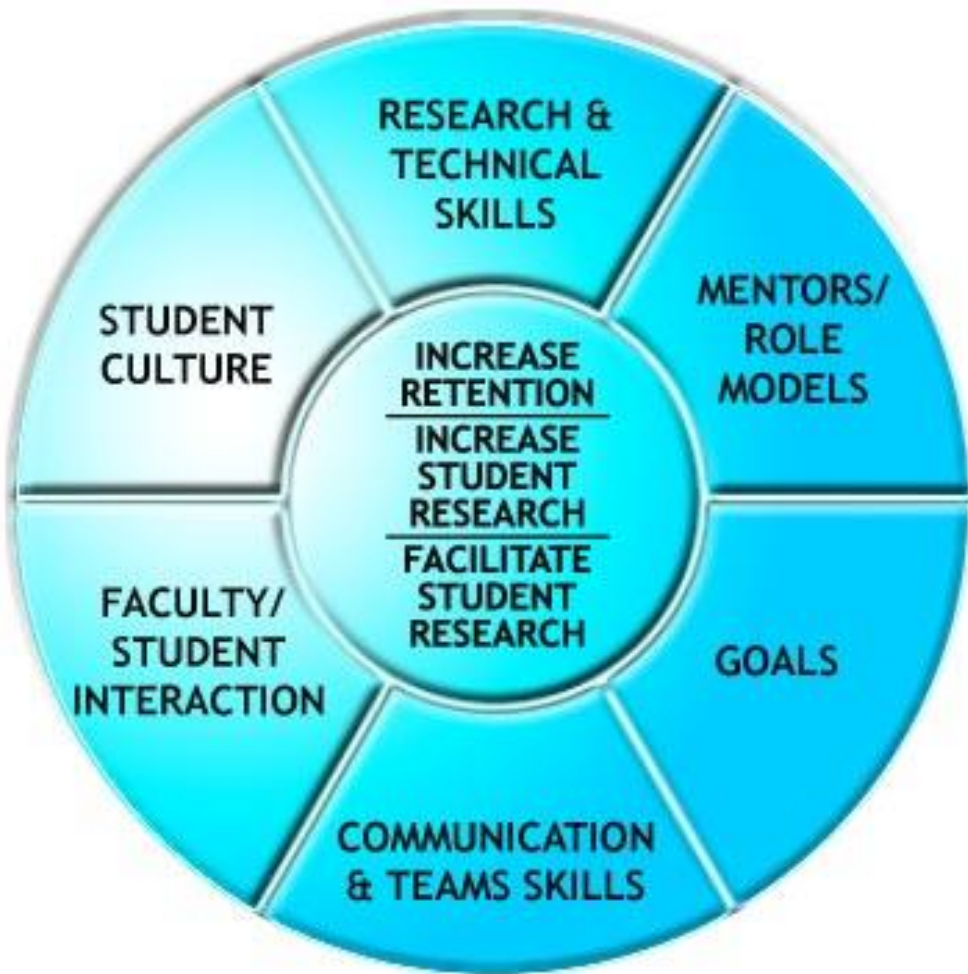
Affinity Research Group Model

A comprehensive model that

- Creates and maintains dynamic, productive, and inclusive research groups.
- Involves the *deliberate design* of research groups whose members share a common purpose – an *affinity*
- Emphasizes the conscious development of students' disciplinary knowledge, research abilities, and team skills
- Provides a sense of professional identity and belonging.

GOAL OF AN ARG

Purposefully and intentionally develop students' skills through active engagement for success in current and advanced studies, research, and the workforce.



An ARG is a non-hierarchical model that promotes:

- *Collection of best practices*
- *Cooperative group interaction*
- *Deliberate and intentional development and practice of skills*
- *Support structures*

Expand participation by recruiting students who may not normally be involved in research

AFFINITY RESEARCH GROUP COMPONENTS



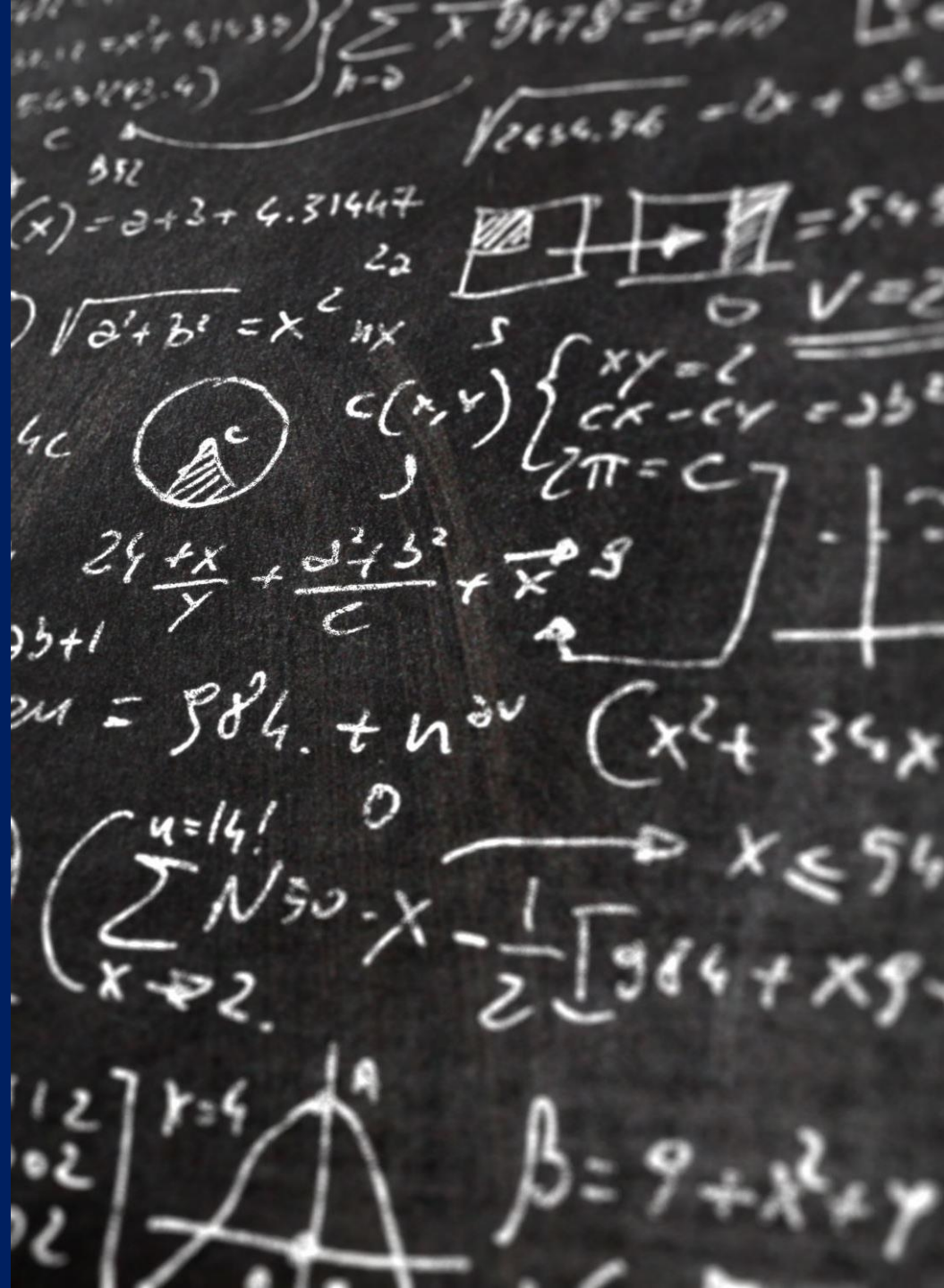
CORE VALUES OF AN ARG

Student Success: An ARG values the deliberate development of skills in each student to ensure success.

Cooperation: An ARG values cooperation in all interactions, including mutual respect of opinions and ideas of all members, promotive interaction, positive interdependence, and individual accountability.

Excellence: An ARG values excellence and strives to achieve it in all its actions.

TEACH AND LEARN COOPERATIVE ELEMENTS



COOPERATIVE TEAM SKILLS

- **P**ositive interdependence
- Individual accountability
- **G**roup processing
- Professional **S**kills
- **F**ace-to-face promotive interaction





Positive Interdependence

- All swim or sink together
- Success of the project is the success of the group
- Structured by:
 - *Team identity*
 - *Mutual goals*
 - *Joint rewards*
 - *Shared resources*
 - *Assigned roles*

Individual Accountability

- Every members feels responsible for contributing to the task and helping the team.
- Structure by:
 - *Reporting status*
 - *Expressing group's perspective accurately*
 - *Assigning concrete tasks and deadlines*





Face-to-Face Promotive Interaction

- Acknowledge contributions of individuals
- Celebrate individual and team members' success.
- Provide constructive critique



What worked?



What didn't work?



How can you
improve?



Discuss, plan,
and refine

Group Processing

We do not learn from
experience... we learn
from reflecting on
experience.

- John Dewey



GROUP
PROCESSING

Social and Professional Skills

Do not assume that those who join a research group or team with the necessary skills to be successful.

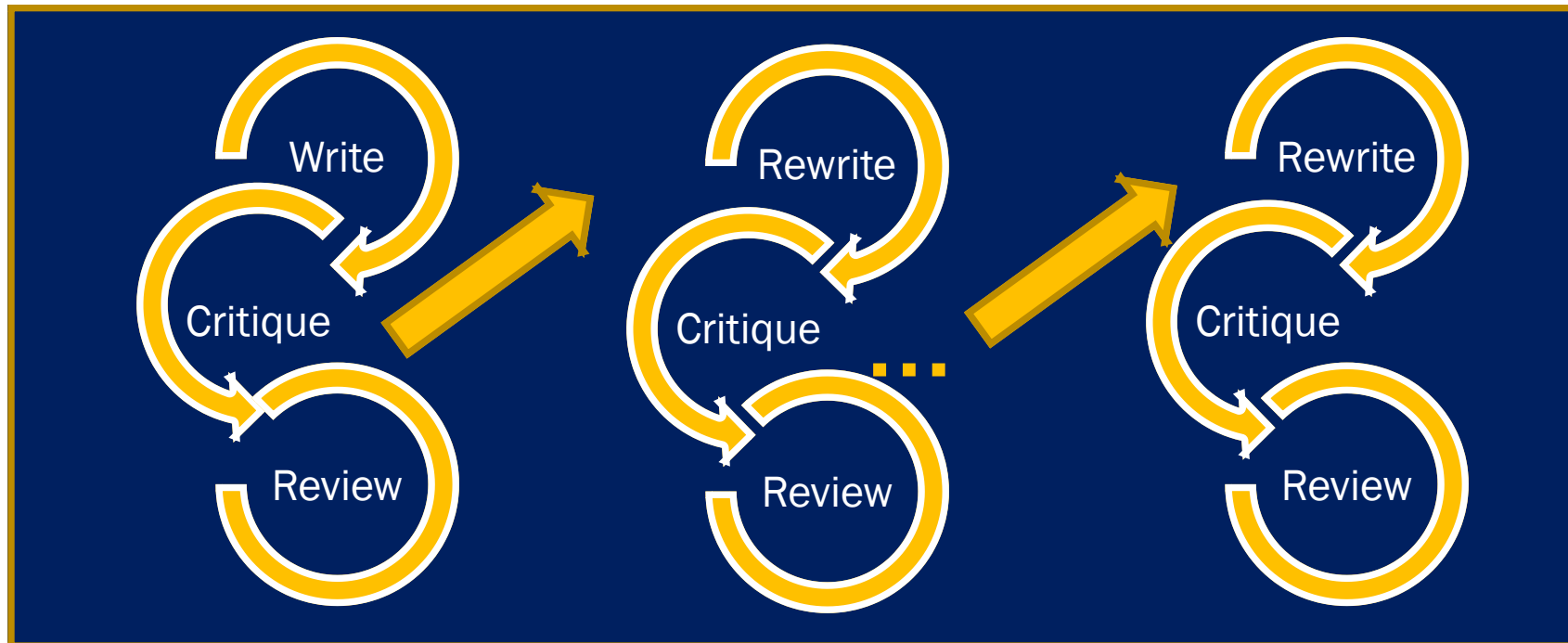
- Understand the need to learn and practice a skill
- Identify phrases that someone can say when practicing a skills
- Practice skills in an intentional and deliberate manner

SKILLS DEVELOPMENT

- Cooperative team skills
 - Group functioning
 - Paraphrasing
 - Constructive critique
 - Conflict resolution
- Research skills
 - Setting goals and objectives
 - Research plan
 - Literature survey
 - Poster presentation
- Team management skills
 - Defining tasks and activities
 - Defining timelines
 - Setting meeting agenda
 - Documenting meeting minutes
- Communication skills
 - *Oral*
 - *Written*
 - *Constructive critique*

EXAMPLES

- Writing a Personal Statement
- Hints on Writing an Abstract
- Submitting a Successful GRFP
- Setting Clear Goals and Objectives



Phases of Skills Development





Selected Publications

A. Gates, H. Thiry, & S. Hug (2016). “Reflections: The Computing Alliance of Hispanic-Serving Institutions.” *ACM Inroads*, 7(5): 69-75.

E. Villa, E., K. Kephart, A. Gates, H. Thiry, and S. Hug, “Affinity Research Groups in Practice: Apprenticing Students in Research,” *Journal of Engineering Education*, Vol. 102, No. 3, pp. 444-466, 2013.

K. Kephart, E. Villa, A. Gates, and S. Roach, “The Affinity Research Group Model: Creating and Maintaining Dynamic, Productive, and Inclusive Research Groups,” *CUR Quarterly*, Council on Undergraduate Research, Vol. 28, No. 4, pp. 13-24, 2008.



VIRTUAL REU PROGRAM

Purpose of the vREU Program

Work

Work with a faculty research mentors to establish well-defined research project(s) with intellectual merit.

Build

Build a national community of faculty and undergraduate researchers who adopt Affinity Research Group (ARG) practices.

Develop

Focus on the development of research, communication, and technical skills.

ARG Curriculum for vREU Faculty Mentors

Week	Topic	Faculty Homework	Skills Developed
1	Orientation	Introduce self and research	Self-exposition and context. Public speaking & professional presentation
2	Probing Questions	Practice asking probing questions	Critical thinking and listening
3	Abstracts	Draft and discuss abstracts	Collaborative review Scientific writing expertise
4	Elevator or Zoom Pitch	Practice scripted pitch	Public speaking, rehearsal. Strategic thinking
5	Poster Preparation	Layout poster, with hypothesis, proving questions, all.	Research methodology, process. Sequential thinking and presentation
6	Poster Critique	Giving & getting constructive feedback	Critical thinking, understanding dissimilar perspectives, communication
7	Final Report	Draft final report	Writing, crucial thinking
8	Conference registration; Poster Submission	Register for conference with poster	Research communication; presentation

Research Journal



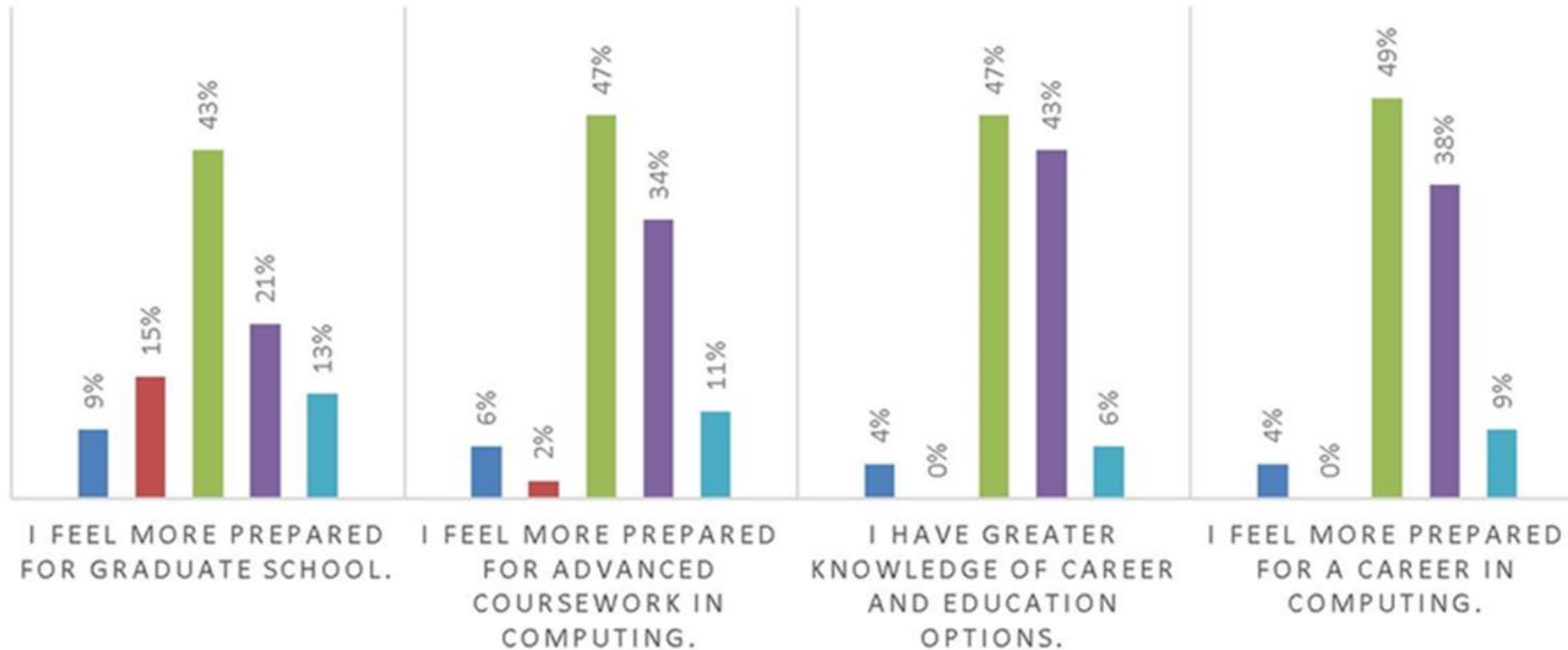
The research journal template form is divided into two sections. The top section is titled "RESEARCH JOURNAL" and includes fields for Project name, Student name, Entry Date, Work accomplished, Problems encountered, Factors that supported success, and What I will change. The bottom section is identical to the top section but includes a small circle icon next to the "Factors that supported or hindered success" field.

- Purpose: To capture research progress, identify areas of need, and future work
- Students: Submit at the end of the week with feedback the following week
- Faculty: Review the research journal template and provide feedback.

The vREU Program

ARG: Academic Program/ Career Readiness In my research experience, or because of my research experience:

■ Strongly Disagree ■ Disagree ■ Agree ■ Strongly Agree ■ I don't know



Online format was viable, show comparable self-reported results to last face to face study for CAHSI (2017)

Faculty appreciated a) the structure, b) resources for students, and c) access to faculty member peers.

CONTACT INFORMATION

Contact: Ann Q. Gates, agates@utep.edu

Website: <http://cahsi.org>

Handbook

A. Gates, S. Roach, E.Y. Villa, K. Kephart, C. Della-Piana, and G. Della-Piana, *The affinity research group model: Creating and maintaining effective research teams*, Los Alamitos, CA: IEEE Computer Society, 2008.