Embedding Research for Undergraduate STEM Students in the Freshmen Curriculum

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NU Bioscientist prepares students and mentors for summer research

Students are selected based on predicted persistence in research
- Freshmen interested in biomedical research
- Selection based on predicted persistence in research instead of standardized exams and previous experiences
- Application consists of four short-answer questions
- Themes that differentiated career paths between research and medicine:
  - Curiosity to discover the unknown
  - Enjoyment of problem solving
  - Helping others indirectly
  - Independence
  - Minimally structured views of the future

"Right now, who knows ... I just want to leave the door open ..."
"I don't have to rely on others to tell me things"

NU Bioscientist increases the number of freshmen funded in research

NU Bioscientist program logic model

Students engage in an authentic research process

- Find a laboratory and mentor
- Write research proposal with mentor
- Attend research meetings in laboratory
- Perform independent research
- Literature review
- Methods
- Proposal draft
- Oral presentation
- Final proposal

Time spent with students on summer projects

Most challenging aspects of mentoring
1. Dealing with student’s inexperience (knowledge and skill)
2. Setting reasonable goals for project
3. Allocating time
4. Identifying student’s motivation
5. Keeping student engaged
6. Deciding on the “best solution” to a given mentoring challenge
7. Managing expectations
8. Addressing student’s misconceptions about science
9. Fostering student’s independence
10. Meeting needs of student while also meeting needs of own project

Self-reported changes in mentoring skills
1. Helping student plan a project
2. Developing strategies to deal with mentoring challenges
3. Addressing diversity issues
4. Resolving conflicts in mentoring
5. Assessing student’s learning and understanding
6. Giving student feedback
7. Building a relationship based on trust and respect