

The Development of Best Practices in Mentoring Undergraduate Research



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Introduction

- Benefits of undergraduate research experiences have been highly touted
- National Research Council (2009) recommended implementing undergraduate research experiences into colleges of agriculture
- While benefits are known, a dearth of literature exists regarding effective mentoring practices

Effective Teaching

- Clarity
- Variability
- Enthusiasm
- Task-oriented behavior
- Organization
- Approachability
- Opportunity to learn
- High expectations
 - Rosenshine & Furst, 1971
- Contact between student and faculty
- Active learning
- Emphasizes time-on-task
- Prompt feedback
- High expectations
 - Chickering & Gamson, 1987

Theoretical Framework

- **Ohio State University Leadership Model** (Halpin, 1957; Stogdill, 1963)
 - **Initiating structure**
 - Leadership traits associated with getting tasks accomplished
 - **Consideration**
 - Leadership traits associated with rapport and trust building

Purpose

- The purpose of this study was to determine best practices in mentoring undergraduate research

Methods

- Delphi study
 - ▣ Expert group was professors at SRSU who had successfully mentored undergraduate research projects
 - ▣ McNair Scholars Program
 - ▣ N = 28
- Sampling frame was provided by the director of the McNair Scholars Program
 - ▣ Potential participants notified via email
 - ▣ Online administration of instrument

Participants

- Mean age = 48.67 (SD = 12.93)
- Male 60%; Female 40%
- Degree attained
 - ▣ M.S. = 13.3%
 - ▣ Ph.D. = 80%
 - ▣ Ed.D. = 0.0%
 - ▣ Other degree = 6.7%
- Rank
 - ▣ Instructor = 6.7%; Assistant professor = 33.3%; Associate professor = 26.7%; Professor = 26.7%; Other = 6.7%

First-Round

- Two open-ended questions based on the Ohio State University Leadership model
 - ▣ What practices have you found that have worked particularly well in helping undergraduate researchers accomplish the tasks associated with conducting research?
 - ▣ What practices have you found that have helped you develop as a mentor to undergraduate researchers?
 - ▣ $n = 19$; 67.8% response rate

Round-Two

- Questions from round one compiled into two lists based on the original questions
 - ▣ 24 statements regarding accomplishing tasks
 - ▣ 28 statements regarding development as a mentor
- Round two measured level of agreement
 - ▣ 5 point Likert-type scale from “strongly disagree” to “strongly agree”
- Statements had to receive at least a 3.50 mean to move to third round
 - ▣ $n = 18$; 64.3% response rate

Round-Three

- Participants indicated whether they agreed or disagreed with the statements
 - ▣ 23 statements regarding accomplishing tasks
 - ▣ 26 statements regarding developing as a mentor
- Agreement of 70% required for a statement to be included in the “best practices”
 - ▣ $n = 15$; 53.6% response rate
 - 10-15 respondents is acceptable for Delphi study (Nistler, Lamm, & Stedman, 2011)

Results

Items Regarding Accomplishing Tasks (<i>n</i> = 15)	% Agreement
Being a good listener	100.00
Giving students responsibility for their own success	100.00
Regularly scheduled face-to-face meetings	100.00
Having good support from undergraduate research coordinator	100.00
Provide examples of typical article formats	100.00
Show examples of others' research to help students get ideas	100.00
Make sure the student has a clear understanding of the scope of the research	100.00
Develop a good prospectus	100.00
Help students find materials for their research	100.00
Hands on participation with the student researching in the lab/field	93.33
Letting students choose topics of interest to them	93.33
Set specific weekly goals and tasks	93.33
Monitor students' progress closely	93.33
Reading students' work prior to meetings in order to set an agenda for the meeting	86.67
Using previous models and designs as templates to build new projects	86.67
Frequent contact via email	73.33
Working in a topic area that is familiar to the mentor	73.33

Items Regarding Developing as a Mentor (<i>n</i> = 15)	% Agreement
Allow students to explore areas that interest them	100.00
Regular interactions with students	100.00
Listening to the students to understand their interests	100.00
Give students primary responsibility for completing all aspects of the project	100.00
Frequent review of work	100.00
Good time management	100.00
Good organizational skills	100.00
Clear expectations	100.00
Listening to students' needs	100.00
Finding interesting problems to investigate	100.00
Constant feedback to students	93.33
Asking questions to spot students' strengths and weaknesses	93.33
Knowing the students' strengths and weaknesses through prior classroom interaction	92.86
Being available for assistance and counseling	86.67
Basing mentoring on how students respond to different tasks	80.00
Positive reinforcement, but no tolerance for excuses	80.00
Becoming more collegial with students	80.00
Discussing things with students other than the project	73.33

Conclusions

- Many of the effective mentoring practices aligned with effective teaching practices
 - ▣ Clarity, setting expectations, organization, feedback, providing opportunity to learn, approachability, quality and quantity of contact between mentor and student
- Some overlap between initiating structure responses and consideration responses
 - ▣ Some consideration responses focused on task accomplishment
 - ▣ Possibly due to wording of questions
 - ▣ Possible perception that “effective” mentors accomplish tasks

Recommendations

- Due to limitations of this study, results are not generalizable
 - Specialized program
 - Hispanic Serving Institution
 - Small number of participating faculty members
- Further research should:
 - Investigate these RQs in other settings
 - Use survey methodology to examine task accomplishment and mentorship separately
 - Seek out student perspectives on mentoring

Recommendations

- Mentors of undergraduate researchers should:
 - ▣ Develop and use practices that build rapport
 - ▣ Follow practices of effective teaching to promote optimal student learning in the research process
 - ▣ Seek out assistance from others with mentoring experience
 - ▣ Set clear expectations for students
 - ▣ Be consistent and organized

Thank you!

- Questions?

